Army Regulation 715–27
NAVSUPINST 4355.5B
AFR 74-3
DLAM 4155.1

PETROLEUM CONTRACT QUALITY ASSURANCE MANUAL

Headquarters
Departments of the Army,
the Navy, and the Air Force
and Defense Logistics Agency
Washington, DC
10 February 1988

Unclassified

SUMMARY of CHANGE

AR 715–27/NAVSUPINST 4355.5B/AFR 74–3/DLAM 4155.1
PETROLEUM CONTRACT QUALITY ASSURANCE MANUAL

RESERVED

FOREWORD

This manual implements DoD Directive 4140.25, Management of Bulk Petroleum Products, Storage, and Distribution Facilities, and provides instructions for the establishment and maintenance of quality programs and inspection systems for the acquisition of petroleum products and services. These measures are designed to assure that supplies and services furnished the Government comply with contractual requirements.

The procedures prescribed in this manual are applicable to HQ DLA, DLA field activities, and the Military Service Departments, and are to be followed in determining acceptance of petroleum supplies and services. This manual has been coordinated with and concurred in by the Military Services. In the event of conflict between this manual and other instructions, the provisions of this manual will govern.

This manual together with the provisions of the contract;DLAM 8200.1, Procurement Quality Assurance; and DoD 4140.25–M, Procedures for the Management of Petroleum Products, sets forth the general requirements, procedures, and information necessary for the functions of quality assurance and quality surveillance of petroleum products and related services. The manual intended to guide qualified personnel, already experienced with petroleum, in performing their functions in a satisfactory manner exercising their skills and experience for the solution of detailed problems that may arise. The Military Departments and DLA will assure that only personnel who meet the established Civil Service requirements for GS–1910 (Chemicals) Quality Assurance Series, and have been properly trained in the applicable petroleum areas are used to perform contract quality assurance or quality surveillance on contracts for petroleum supplies and services.

This manual should be read in its entirety. The procedures set forth herein are in accordance with Department of Defense quality assurance concepts and policy. Responsibility rests with the contractor for controlling quality and for offering for Government acceptance only those items or services which conform to contract requirements. Responsibility rests with the Quality Assurance Representative for assuring that contractual requirements have been met prior to the acceptance of the product or service. Determination of conformance will be based on objective evidence of quality and quantity. The guidance contained in DLAM 8200.1 will be followed for establishing the basic elements of a Petroleum Contract Quality Assurance Program.

Requests for relief to specific mandatory inspection requirements of this manual imposed on QARs/QSRs should be referred to DFSC–Q, Cameron Station, Alexandria, VA 22304–6160, for bulk petroleum products and DGSC–Q, Richmond, VA 23297, for packaged petroleum products, along with supporting justification. Government Quality Assurance personnel shall continue to perform mandatory inspection requirements unless relief is granted in writing by the procuring agency.

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Effective 10 February 1988

PETROLEUM CONTRACT QUALITY ASSURANCE MANUAL

BY ORDER OF THE DIRECTOR

JAMES J. SINGSANK
Colonel, USA
Staff Director, Administration

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Section 1
RESPONSIBILITIES

1.1. GENERAL

1.1.1. Throughout this manual, Quality Assurance Representative(QAR) is used as a generic term applying to the individual responsible for the Government CQA function at a given contractor's facility. QARs have cognizance over the procurement of product or services at contractor facilities such as refineries, terminals, packaging plants, laboratories, and into–plane sites. The petroleum quality surveillance representative (QSR) is the Government representative responsible for assuring contractor compliance to the requirements of petroleum service contracts and pipeline tariff/operating agreements. The QSR serves at storage terminals(both contractor–owned/contractor–operated (COCO), and Government–owned/contractor–operated) (GOCO), commercial testing laboratories, pipeline terminals, and any place operations occur involving Government–owned petroleum products.

1.1.2. In accordance with DoD 4140.25–M and as prescribed in DoD 4105.59–H, DoD Directory of CAS Components, within the Continental United States (CONUS), Defense Contract Administration Services Regions (DCASRs) are responsible for Contract Quality Assurance(CQA) pertaining to the acquisition of all bulk and packaged petroleum products including into–plane contract and contract bulletin. DCASRs are also responsible for Quality Assurance/Surveillance (QA/QS) on Strategic Petroleum Reserve crude oil. The DFSC is responsible for QS of all Government–owned bulk refined petroleum products in CONUS (i.e., Government–Owned, Contractor–Operated; Contractor–Owned, Contractor–Operated; pipeline facilities; and fuel depot operations), and CQA/QS for all bulk petroleum products overseas. CQA and QS overseas may be delegated to a Military Service activity, where the Service has agreed to accept the responsibilities.

1.1.3. The Government QAR assures that contractors comply with contractual requirements in furnishing petroleum products and services. The QSR assures that contractors comply with contractual requirements in furnishing services. Since acceptance by the QAR/QSR is conclusive except for latent defects, fraud, or such gross mistakes as amount to fraud, extreme care will be taken to assure that all technical and quality requirements of the contract are fully complied with prior to acceptance. Neither the QAR nor the QSR shall enter into informal agreements which may compromise the contract or accept voluntary services for the Government unless contracting officer approval is first obtained.

1.1.4. The field activity responsible for performing CQA on behalf of the Government is normally assigned in the contract. CQA assignments are based on DoD 4105.59–H. When the assigned quality office determines that CQA inspection is required at points under the cognizance of another quality activity, the assigned office will request assistance pursuant to the procedures contained in DLAM 8200.1. However, DCAS will not delegate inspection requests to DFSC activities in CONUS.

1.1.5. In order to effectively manage the quality program, each facility indicated in the contract will be assigned to the responsibility of a specific QAR/QSR. These facilities may be refineries, laboratories, terminals, and into–plane sites. The assigned individual may be either a resident or nonresident QAR/QSR and will be responsible for monitoring all aspects of the quality program at his assigned contractor facilities.

1.2. RESPONSIBILITIES OF PETROLEUM QUALITY REPRESENTATIVES

The QAR/QSR Assigned Responsibility at a Contractor's Facility shall:

1.2.1. Assure that the contractor establishes and maintains an acceptable program for the control of quality of petroleum products furnished to, or handled for, the Government.

1.2.2. Assure that the contractor prepares satisfactory written description of his inspection system prior to production or performance.

1.2.3. Assure the contractor complies with the contractor's quality control program IAW DLAM 8200.1, section IV, for the following contractor operations:

1.2.3.1. Addition of approved blending components such as metal deactivators, corrosion and oxidation inhibitors, viscosity stabilizers, fuel system icing inhibitors, and static dissipation additives.

1.2.3.2. Sampling of batches or lots of petroleum products produced by, received by, or stored at the facility.

1.2.3.3. Specification testing of petroleum products in contractor's facilities, including calibration of testing and measuring equipment, and standardization of solutions.

1.2.3.4. The control of refinery and terminal pipelines, manifold connections or valves used to convey the product to the loading or packaging point.

1.2.3.5. Inspection of containers for cleanliness and suitability to receive product prior to filling or loading.

1.2.3.6. Packaging of product, marking of containers, and proper stowage or loading of shipping conveyances as required by contract, e.g., MIL–STD–290. The use of DoD Procurement Inspection Stamps will be in accordance with applicable DoD instructions.

1.2.3.7. Adequacy of sealing procedures for containers and recording of serial numbers on records and shipping documents, when applicable.

1.2.3.8. Loading and discharging of tankers and barges.

1.2.3.9. Determination of quantities.

1.2.3.10. Accomplishment of required forms and reports.

1.2.3.11. Prompt notification to consignee on all tank car and boxcar(carload only) shipments, indicating grade of product, date of shipment, car and seal numbers, bill of lading numbers, and net quantity.

1.2.3.12. Movement of petroleum products via single and multi–product pipelines.

1.2.4. Report to the cognizant Contract Administration Office(CAO), Defense Fuel Region, and the ordering officer of the activity placing the order, information on incipient or actual production stoppages or delays in shipments caused by labor strikes, fires, or other conditions which result in nonavailability of cargo or inability of the contractor to perform. The reports will be made by teletype or telephone as soon as possible, but not later than the next working day. When inability of contractor to perform, or nonavailability of product will involve delay in loading a Military Sealift Command (MSC) controlled tanker, pertinent details, including a length of delay anticipated, will be reported by the QAR/QSR as follows, regardless of reports that may be made by other activities:

1.2.4.1. At CONUS locations telephone MSC, Washington, DC. During normal working hours the call should be placed to (202) 282–2925;during other hours to the MSC Duty Officer at (202) 282–2609 or 2610. All calls should be confirmed by message to Commanding Officer, MSC (COMSC), Washington, DC, with the local MSC Representative, and Defense Fuel Supply Center (DFSC), Alexandria, VA, ATTN: DFSC–OD, as information addressees.

1.2.4.2. At all locations outside CONUS the information will be dispatched by priority message to COMSC, Washington, DC, with the same information addressees as for CONUS.

1.2.5. Perform the following, when requested through proper channels:

1.2.5.1. Perform investigations relative to petroleum products reported to be contaminated or causing unsatisfactory operation of equipment. The results of any findings given to using activities will be in an advisory capacity only.

1.2.5.2. Participate in preaward surveys.

1.2.5.3. Monitor the analysis of special samples of products submitted to commercial laboratories under contract.

1.2.5.4. Maintain surveillance over the special blending and compounding of products.

1.2.5.5. Assist the military supply and transportation offices on pertinent matters.

1.2.5.6. Perform functions and investigations at the facility, such as effecting termination settlement by ascertaining the quality and

quantity of products on hand, volume of tank bottoms, and number of drums.

1.2.6. Advise the contracting officer, through the appropriate supervisory channels, of contractor noncompliance with contract provisions in those cases where adequate local correction is not possible or failure to report might jeopardize the rights of the Government under the contract.

1.3. ADDITIONAL RESPONSIBILITIES OF THE QSR

1.3.1. In addition, because of the QSR's technical skills and the specialized nature of the products, the QSR performs certain supply and transportation functions in rendering assistance to the contracting officer and the fuel accountable officer.

1.3.2. In some cases contracts relating to receipt and storage of products procured for Government use require the contractor owning the facility to provide a laboratory. If the contractor does not provide technical personnel to perform laboratory testing, the QSR is responsible for performing those tests necessary to assure the quality of products received, stored, and shipped at that location.The QSRs will be guided by the instructions contained in MIL–HDBK–200 and DoD 4140.25–M when applying quality surveillance on Government–owned products under the above circumstances.

1.3.3. Maintain vigilance over quality and quantity of Government–owned petroleum products, containers, and equipment in the possession of contractors.

1.3.4. Approve and certify contractor's invoices, when required by the contract.

1.3.5. The QSR will promptly advise the contracting officer of the date and time a commercial storage tank used to store Government–owned product is put into or removed from service. Such reports will apply to the removal of tanks from service for cleaning or repairs as well as initial use or termination of use under a contract.

1.3.6. Verification of Inventories, Losses, and Services

1.3.6.1. Contractors are obligated to adequately protect Government–owned property located on their premises for use on, or in connection with a contract. The periodic inventory and reporting of such property is a contractual requirement. The amount of Government–owned petroleum products in pipelines will be reported as a separate item in stock reports.

1.3.6.2. The QSR shall verify the inventory process for Government–owned petroleum product. The QSR will certify the accuracy of the inventory data and agree or disagree in writing with the contractor's stated cause(s) of losses/gains. There will be no QSR certification on the DD Form 1788, Bulk Petroleum Terminal Report. The results of the periodic QSR inventory verification will be documented with wording from the appropriate contract clause L119 and filed with the individual transaction document. These documents will be kept at the Defense Fuel Supply Point (DFSP), with a copy forwarded to the cognizant property administrator or accountable activity. The cognizant QSR shall perform witnessing of contractor inventories within the time intervals listed below; witnessing the contractor's end–of–the–month inventory is not mandatory. However, consecutive end–of–the–month inventories should be witnessed whenever the adequacy or accuracy of the contractor's inventory reporting system is questionable and until the contractor's system is considered acceptable. The witnessing of the inventory and verification of the contractor's system will normally be scheduled at different times within the intervals provided below. This should be done with the contractor's coordination. The following time intervals will be used, as a minimum, in determining the frequency of inventory verification:

1.3.6.3. Activity DFSP (three or more issues/receipts in six months): witness inventory and verify against receipts/issues monthly.

1.3.6.4. Semiactive DFSP (less than three issues/receipts in six months): witness inventory and verify against issues/receipts once each calendar quarter.

1.3.6.5. Commingled storage (Government–owned product stored with contractor–owned product): verify that sufficient inventory is on hand each calendar quarter.

1.3.6.6. Foreign government and North Atlantic Treaty Organization held storage under Memorandums of Agreement (MOUs) or country–to–country agreements: inventory will be witnessed and verified by the QSR according to the terms of the MOU or agreement.

1.3.6.7. In the event that the QSR's opinion as to loss data is at variance with the statements of the contractor, the QSR will submit his reasons for nonconcurrence by letter to the office receiving stock report. The QSR will assure, to the extent practicable, that all factual data pertaining to losses are included in the stock report or by separate letter. Certain contracts provide for periodic evaluations of contractor performance by the QSR. These reports are valuable tools in the correction of deficiencies and selection of contractors. Accordingly, such reports should factually report any and all significant areas and incidents of poor performance. Details relating to losses and accounting of DLA–owned products are contained in DoD 4140.25–M.

1.3.6.8. Losses of Government–owned product in the custody of contractors, which are caused by accident or mishap, including line breaks, tank overflows, spillage, product contamination and fire, will be investigated by the QSR, and a detailed factual report made to the accountable activity and the contracting officer.

1.3.6.9. Government property is subject to loss, damage, or destruction and may be found, upon receipt, to differ from the property indicated to have been shipped. In order to assist in the preparation of reports of survey, the QSR responsible for inspection of shipments received will submit all pertinent information to the designated accountable activity and the contracting officer.

1.3.6.10. Certain contracts require the QSR to certify the contractor invoice for specified services delineated in the contract, e.g., guard service, laboratory testing services, overtime, etc. Since the QSR normally is not physically present at the facility during the entire period covered by the invoice, a certification substantially as follows should be used, "Based on recorded checks made during surveillance of the contractor's quality program and a review of the contractor's time and attendance records, I certify _____."

1.3.6.11. The QSR is responsible for developing his own checklists and tailoring them to the particular facility.

1.3.7. Report of Survey

1.3.7.1. SF 361, Transportation Discrepancy Report, is prepared by the designated accountable activity when Government–owned petroleum and related products, shipped on Government bills of lading, are received at a contractor's facility in an improper condition, and such damage, loss, or destruction is attributable to causes incident to shipping. In order to facilitate the preparation of this report, the QAR responsible for inspection at contractor's facilities receiving shipments will submit all pertinent information in connection therewith to the designated accountable activity. The QSRs will check shipments to determine the extent of the damage, shortage, and the cause, if possible.

1.3.7.2. Information and documents required:

1.3.7.3. Two true copies of Government bill of lading, including discrepancy notation on the reverse side.

1.3.7.4. Certified true copies of the freight bill or delivery receipt showing any discrepancy notation and signature thereon.

1.3.7.5. A signed statement of the carrier's local agent (carrier's inspection report) admitting existence of the shortage or damage. It will be noted that this is not an admission of liability.

1.3.7.6. The receiving checker's signed statement containing the bill of lading number, the number of packages received, the condition of the packages, a record of seals on the car or vehicle at origin and destination, and whether applied by shipper or carrier, and a statement as to the cause of damage, if known;otherwise, a reliable opinion based on circumstantial evidence will be furnished.

1.3.8. Assist in the development of operating agreements between the Government and the carrier that establish procedures for transportation, accountability, and quality control of Government fuel. The instructions applicable to petroleum movements via Government–owned multiproduct pipeline systems are contained in

the Quality Surveillance Handbook for Fuels and Lubricants(MIL–HDBK–200) and departmental instructions.

1.3.9. Samples of Government–owned petroleum products in bulk storage at Government or contractor–operated terminals in CONUS will be submitted in accordance with MIL–HDBK–200 to the areas laboratories designated below.

1.3.10. When Government–owned stock in the custody of a contractor is indicated to be off–specification or projected to deteriorate below specification requirements in the near future, copies of the test reports will be forwarded to the Defense Fuel Supply Center, ATTN: DFSC–QE, Cameron Station, Alexandria, VA 22304–6160; and one copy to the appropriate Defense Fuel Region as listed in paragraph 2.14.5. The reports will clearly indicate. the. product deficiency by appropriate comment on the reports and its relation to any recommended disposition action.

Section 2
GENERAL PROCEDURES AT PETROLEUM FACILITIES

2.1. GENERAL

2.1.1. Normally the contract or delivery order will require quality actions by the Government at the point of shipment.

2.1.2. Although the Government reserves the right to inspect at any point prior to acceptance, demands for inspection are limited to a realistic level which will give the desired assurance of quality.The requirements for Government CQA are detailed in DLAM 8200.1.

2.1.3. The QAR/QSR will become familiar with the contractor's operations to the extent necessary to ascertain compliance with contractual requirements. Demands will not be made on the contractor concerning materials or processes considered to be the contractor's confidential information and not required by the QAR/QSR to assure compliance with contract for specification requirements. If such information is furnished or obtained by the QAR/QSR, the contractor's confidence will be respected. Contracts for materials or products containing materials or processes of such proprietary nature should specifically state the extent of verification expected in procurement examination by the QAR/QSR. Those components or processes which the QAR/QSR is not required or allowed to verify must be delineated.

2.2. PLANNING CQA ON PETROLEUM CONTRACTS

QARs/QSRs will follow the guidance in DLAM 8200.1, section IV, part 1, Concepts and Planning, when reviewing contracts for quality requirements. A postaward is recommended if the criteria in DLAM 8200.1, section III, is met. The contractor's quality program or inspection system will be established in accordance with contract provisions. When the contract requires written procedures, guidance in DLAM 8200.1, section IV, part 2, Procedures Review, will be followed to determine the adequacy of the contractor's quality control procedures. The following details should normally be included in the contractor's written procedures:

2.2.1. A chart of the local organization concerned with the quality program and shipment of products on contracts. This chart will indicate the title of key positions, the names of the incumbents, and their responsibility in the quality program.

2.2.2. If necessary to the quality program, a schematic diagram of the handling system employed by the contractor for each product under contract.

2.2.3. Quality control procedures for the following operations, as applicable:

2.2.3.1. Receiving.
2.2.3.2. Blending and compounding.
2.2.3.3. Sampling.
2.2.3.4. Testing.
2.2.3.5. Storage and handling.
2.2.3.6. Packaging, packing, and marking.
2.2.3.7. Loading and shipping.
2.2.3.8. Records and reports.
2.2.3.9. Quantity measurement.
2.2.3.10. Calibration of equipment.

If inadequacies are found after procedures review, corrective action will be requested in accordance with provisions of DLAM 8200.1, section IV, part 5, Corrective Action. Difficulties that cannot be resolved at the local level will be referred to the contracting officer through supervisory channels.

2.3. MAINTENANCE OF AN ACCEPTABLE QUALITY PROGRAM

The QAR/QSR shall assure that the contractor is complying with his written quality control procedures by performing procedures evaluations of the contractor's operations. Procedures Evaluation(PE) checklists shall be developed by the QAR/QSR using the provisions of DLAM 8200.1, part IV, section 3, or ELAM 8200.2, Procurement Quality Assurance Support Manual for Defense Contract Administration Services, section IX, part 2. When establishing frequencies of evaluation, the QAR/QSR shall consider the contractor's operation recognizing that petroleum refineries and terminals ship products on a 24–hour day, 7 days per week schedule.(Other CQA actions and manpower shall also be planned accordingly.)Instances of noncompliance shall be recorded and necessary corrective action requested in accordance with DLAM 8200.1, section IV, part 5. In accordance with DLAM 8200.1, a suitable record of all checks made at a contractor's plant will be incorporated in the QAR's/QSR's file and will evidence product inspection accomplished systems and procedures checked, discrepancies noted, corrective action taken, and follow up to assure effectiveness of corrective action taken.

2.4. BLENDING

2.4.1. When additives are required in finished blends, it may not be possible or feasible to determine the amount of additive contained after blending is completed. Accordingly, frequent observation of blending operations is necessary to assure proper quantities are added. Surveillance of these operations should be accomplished using Product Verification Inspection (PVI) or PE checklists according to the provisions of section 3 or section 4 of DLAM 8200.1.

2.4.1.1. If the additive is identified in the end–item specification, contract, or qualification data by proprietary, trade, or chemical name; and chemical or physical properties are not specified, no certification by the manufacturer or testing of the additive by the blending contractor will be required. The additive must, however, be properly identified by package marking or shipping documents.

2.4.1.2. Antiknock fluids for engine fuel should be accepted on the basis of the certification of each lot by the supplier of the fluid that the material has been tested and determined to comply with the specification requirements.

2.4.1.3. Additives, other than as covered in the paragraphs immediately above, for which specific properties are established directly or by reference in the end–item specification, will be subjected to all specified physical or chemical tests to determine compliance. These tests may be performed either by the additive manufacturer or by the contractor using the additive. If the additive supplier furnishes a test report identifiable with the material, the QAR/QSR may accept such as quality evidence without requiring further tests unless the material appears to be other than as represented.

2.4.2. Homogenizers and other mechanical means of in–line blending may be used in lieu of batch blending upon the approval of the contracting officer in coordination with the appropriate Military Department to arrive at the finished product. Such equipment will be fully checked by the QAR/QSR prior to use on contract deliveries and control procedures established to assure satisfactory deliveries.Authorized additives such as fuel systems icing inhibitor or corrosion inhibitors are permitted to be line blended into the product without prior approval.

2.5. TRANSFER FACILITIES

2.5.1. Material approved for shipment should be transferred from storage to shipping containers through an independent or properly protected system incorporating blind flanges, spectacle plates, or

double valves with open bleed valve between them to prevent contamination. Single valves so designed as to provide the same protection are also acceptable if positive isolation is assured. All valves will be properly set, and where critically located, sealed so as to prevent inadvertent opening. If such properly isolated system is not provided, the QAR/QSR may request testing of samples taken from loaded/filled shipping containers to assure quality. While the contractor is responsible for product quality to the point of acceptance, it will be borne in mind that on origin deliveries the contractor cannot be held responsible for quality beyond the downstream extremity of his delivery system. Therefore, sufficient samples must be secured and checked to establish proper quality of product moving to Government–furnished conveyances. However, if the contractor in–line blends into a shipping conveyance, he will be responsible for final quality of product in the conveyance.

2.5.2. Except in an emergency, water will not be used at refineries or terminals as tank bottoms or to purge lines. If such an emergency occurs, contact of water with fuel must be held to a minimum, and water removal actions taken as soon as possible. Prompt elimination of water is necessary to:

2.5.2.1. Prevent or control microbial growth.

2.5.2.2. Eliminate detrimental effect on icing inhibitor.

2.5.2.3. Reduce the possibility of corrosion in fuel systems of operating equipment.

2.5.2.4. Assure delivery of clean dry product.

2.6. STORAGE TANKS

2.6.1. The QAR/QSR will assure that refinery or terminal tankage used to store petroleum products which have been tested and approved as specification product is adequate for the intended purpose. Tanks used for storage of products will be sound, free of roof leaks, and, in the case of floating roof tanks, equipped with roof drains which do not spill water into the product stored. In addition, when inspecting these tanks, as well as tanks which contain product approved for shipment, consideration will be given to:

2.6.1.1. Absence of contaminants. The rust test, as described in paragraph 4.4.3., should be conducted on scrappings from each storage tank when feasible.

2.6.1.2. Location of suction line to prevent inclusion of undesirable tank bottoms in shipments.

2.6.1.3. Availability of certified calibration tables.

2.6.1.4. Provisions for control of water bottoms, where permitted.

2.7. FILTERING/STRAINER DEVICES

The QAR/QSR willperform surveillance to assure that contractors maintain filtering devices in tank car, tank truck, and small container filling lines to guard against rust, scale, and sediment being carried over into shipping containers.Filtering devices will conform to the contract requirements.

2.7.1. Installation of filters will be such as to permit ready accessibility for removal, inspection, and cleaning.

2.7.2. Periodic scheduled inspection of filters and water separators will be made by the contractor at such intervals as will assure proper functioning. Factors such as volume handled, differential pressure, observed conditions, etc., should be considered in evaluating the contractor's intervals of inspection.

2.7.3. A written record of inspections will be maintained by the contractor indicating date of inspection, condition, and any replacements or repairs made. The QAR/QSR will periodically check these records.

2.8. QUANTITY MEASUREMENT

The QAR/QSR will exercise sufficient surveillance over the quantitative measurement of products to assure reliability and accuracy. Quantity measurement will be in accordance with the version of the American Society for Testing and Materials (ASTM)Manual on Measurement and Sampling of Petroleum and Petroleum Products specified in the contract. The following general procedures will be employed with determining the quantities of petroleum products handled at refineries or terminals:

2.8.1. Unless otherwise cited in the contract, quantities shipped or received by barge or tanker will be determined from shore tank gauges. Where circumstances incident to a particular measurement are such as to render shore measurements unreliable, an alternate measurement method may be used and quantity documents appropriately annotated. Meters may be used for measuring bunker and crude oil quantities providing their accuracy is established and maintained(see section 12).

2.8.2. Quantities shipped by tank car will be determined in accordance with contract provisions.

2.8.3. Quantities shipped by tank truck will be determined from the truck calibration table, the net weight of product loaded, or by use of a properly calibrated meter. Trucks will be rejected if the calibrations are indicated to be inaccurate because of tank damage, altered markers, or other substantive reason.

2.8.4. Drums and other small containers will be filled to the volume specified in the contract. Volume placed in containers will be determined by measured volume (temperature corrected) or actual weight. When meters are used, containers will be weighed during filling operations at sufficient intervals to assure accuracy of meters.

2.8.5. Quantities moved by pipeline will be determined by use of approved meters or from tank gauges at the FOB point unless otherwise specified in the contract.

2.8.6. Meters used in determining quantities of products moved will be proved at a frequency and to the precision established by the contract, by local regulations, or by the contractor's or the manufacturer's requirements as appropriate. The QAR/QSR will assure that the contractor has an adequate calibration procedure covering his measuring equipment. The Manual of Petroleum Measurement Standards, chapter 4, 'Proving Systems,' chapter 5, 'Metering,'chapter 11, 'Physical Data Tables,' and chapter 12, 'Calibration Quantities,' will be used as a guide in the calibration of meter provers.

2.9. PRODUCT WAIVERS

2.9.1. It is DLA policy to accept only those supplies and services which fully conform, in all respects, to the contract requirements.The offer of nonconforming supplies or services to the Government for acceptance should be the exception, and contractors should be discouraged from submitting requests for waivers.

2.9.2. The QAR/QSR will initially review the contractor's product waiver request and determine whether the waiver is major (Type 1) or minor (Type II). All off–specification test characteristics submitted for waiver requests shall be classified as major nonconformances and processed as such unless the specification or contract clearly defines major and minor characteristics. The contractor's request for waiver will be coordinated with the QAR/QSR prior to the contractor forwarding the request to the contracting officer. (This coordination must be detailed as a mandatory requirement in the contractor's written description of the inspection system.) The QAR/QSR will complete a DD Form 1998, Comments on Waiver, Deviation or Engineering Change Request, blocks 1 thru 8, and blocks 13 and 14. As a minimum, one copy is retained by the QAR/QSR, and an original is attached and forwarded with the contractor's waiver request. The QAR's/QSR's evaluation of the waiver will be entered in block 14. The QAR/QSR shall verify that the contractor has taken positive action to correct and prevent recurrence of the condition causing the nonconformance.

2.9.3. In the situation where there would be a disruption of a shipment, such as a tanker/barge delivery or a pipeline tender, etc., or during off–duty hours, a telephone request by the contractor is permitted. When a telephonic request is made, the contractor is required to submit a written confirmation of that request through the QAR/QSR within 24 hours, or by the next scheduled working day, as applicable. (This requirement should also be documented in the contractor's quality inspection system documentation.) The QAR/QSR shall process the contractor's request using a DD Form 1998 as indicated in paragraph 2.9.2 above.

2.9.4. Whenever any exception to a specification is included in the original contract, or is to be incorporated as a change thereto, such exception will be clearly indicated on DD Form 250 series

documents, Material Inspection and Receiving Reports, for the information of all concerned.

2.10. SUBMISSION OF SAMPLES AND VERIFICATION TESTING

The reliability of contractor's testing equipment and procedures will be checked through the submission of verification samples to Government laboratories. Samples may also be submitted to Government laboratories as a check on adequacy of product handling equipment and for referee decisions in cases where the QAR deems this action necessary. Instructions for submission of these samples are included in section 7 of this manual.

2.11. FORMS AND REPORTS

In addition to those forms prescribed byDLAM 8200.1 and this manual, the use of any other locally approved forms or reports peculiar to a particular situation is also authorized. Forms may be obtained through normal supply channels.

Section 3
TANK CARS, TANK TRUCKS, CONTAINERS, AND PACKAGED PRODUCTS

3.1. GENERAL

The following procedures are applicable on both origin acceptance and destination acceptance shipments.

3.2. INSPECTION OF TANK CARS AND TANK TRUCKS

The QAR/QSR shall assure that the contractor examines tank cars and tank trucks prior to loading to determine suitability for receiving and transporting product. Suitability refers to quality consideration (i.e., tank cleanliness, coating approval, calibration, sealing capability, ability to protect product from contamination, compliance with table 1 conversion chart, etc.), and obvious safety violations including fuel leaks, placarding, defective exhaust systems and tank vent valves, overdue hydrostatic testing of hoses, and presence of fire extinguishers. In the case of lubricating oil shipments, the conveyance shall also be inspected by the QAR/QSR. In the event the QAR/QSR determines that the conveyance is not suitable to load (in the case of a destination delivery) and the contractor elects to load and ship, the QAR's observations will be furnished to the consignee prior to the arrival of the conveyance at destination. The DFSC contracts do not normally permit the contractor to delegate the responsibility for inspection of the conveyance for loading, drawing, and testing of samples, sealing of trucks, quantity determinations and loading operations to the tank truck driver. All inspection and loading of tank trucks for delivery of product under DFSC contracts must be performed by qualified personnel. Table 1, Loading Conversion Chart for Tank Cars and Tank Trucks, shall be used as a key to proper processing when converting from one product to another. (NOTE: In the case of Government–furnished transportation equipment, title for the product passes to the Government at the time product passes through the loading orifice into the equipment; therefore, the contractor is not responsible for the product contaminated, unless the contamination is such as to clearly indicate failure on the part of the contractor.) Acceptable interior coatings for tank cars and tank trucks are listed in the latest editions of the Qualified Products List (QPL) 4556, Coating Kit, Epoxy, for interior of steel fuel tanks (MIL–C–4556, latest edition). However, turbine fuels will not be stored or transported in containers coated with inorganic zinc. A record of all rejected tank cars and tank trucks will be required of the contractor. Such record shall include identification, date and time of arrival, reason for rejection, and initials of the rejector.Instances where equipment or service provided by tank truck carriers are deficient on a recurring basis should be brought to the attention of the cognizant DFR, by the contractor or by the QAR/QSR and subsequent actions taken with the carrier. Information furnished should include the identity of the carrier and the equipment involved, the nature of the discrepancy, the dates and locations of occurrence. In cases where product is loaded on top of Government–owned product remaining in the conveyance from a previous haul, or intentionally left aboard a military truck, and such product is of a nature as will not impair the quality of the shipment, shipping documents will clearly indicate both the total volume and the quantity actually loaded. Contractor facilities may be used to determine the quality of product remaining in the conveyance from a previous haul. In instances where product remaining in a conveyance cannot be identified, the conveyance shall be rejected. Tank cars and tank trucks, received by a contractor from a military activity, which contain a product in amounts greater than 200 gallons will be reported by the QAR to the responsible supply officer by telephone and confirmed by letter as follows:

3.2.1. Name of refinery or terminal, and location.

3.2.2. Identification of transportation equipment.

3.2.3. Data received.

3.2.4. Approximate amount of product in container when received.

3.2.5. Specification and grade of material if known.

3.2.6. Action taken.

3.3. PRELOADING INSPECTION OF TANK CARS AND TANK TRUCKS

3.3.1. The QAR/QSR shall assure the contractor's inspection system determines that:

3.3.1.1. The correct orders for shipment have been issued.

3.3.1.2. The product in the loading line complies with the specification requirements and is representative of the product in the shipping tank.

3.3.1.3. The loading line is protected by double valves or by blinds to prevent contamination of the product during loading.

3.3.1.4. The conveyance has mechanical closures, such as domes, vents, internal and external valves, in acceptable operation condition.

3.3.1.5. The conveyance has discharge lines that are clean, protected, and acceptable for discharging the product without contamination or loss.

3.3.1.6. The conveyance has current, certified calibration charts.

3.3.1.7. The conveyance complies with table 1, Loading Conversion Chart for Tank Cars and Tank Trucks.

3.3.1.8. The conveyance interior is visually inspected for rust, scale, sediment, water, or other foreign material. Presence of foreign material that cannot be removed shall be cause for rejecting the conveyance.

3.3.1.9. The placard–holders are secured to the conveyance.

3.3.1.10. The internal condition of the discharge lines are examined for loose rust, scale, sediment, water, and other foreign material.Follow procedures in 3.3.1.8.

3.3.1.11. If the equipment contains a pump, all lines leading to and from the pump shall be drained completely along with the pump itself. Collect any material that drains and identify it.Hydrocarbons and water contaminants can be identified using basic petroleum tests.

3.4. INSPECTION OF LOADED TANK CARS AND TANK TRUCKS

3.4.1. The QAR/QSR shall monitor the contractor's operation to assure that:

3.4.1.1. The contractor performs tests on representative samples taken from each loaded conveyance to verify that product quality has not been adversely affected during loading. All products which can be visually examined shall be checked for water and sediment. Free water shall be removed prior to shipment except for jet fuels and lubricating oils, in which case the conveyance shall be rejected.Generally, the tests in the following table shall suffice for verification of the contractor's tender report. If any test results exceed the reproducibility listed in the test method, further testing is required.

Table 3–1

TEST	AVGAS	MOGAS	JP–4	JP–5/8	DIESEL/KERO/FUEL
API GRAVITY	X	X	X	X	X
APPEARANCE	X	X	X	X	X
VISUAL COLOR	X	X	X	X	X
FSII	–	–	X	X	X
FLASHPOINT	–	–	–	X	X
DISTILLATION	X	–	X	–	–

3.4.1.2. Contractor maintains test results as a matter of record.

3.4.1.3. An appropriate sample from each conveyance is retained by the contractor for the period designated in paragraph 6.5 of this manual.

3.4.1.4. Conveyances are effectively sealed by the contractor with numbered seals prior to release. Domes and/or unloading valves in the case of tank cars and all openings in tank trucks shall be sealed. Numbered seals shall be provided by the contractor and numbers shall be shown on the DD Form 250, and SF 1103, U.S.Government Bill of Lading, or other shipping document.

3.4.1.5. The contractor verifies that the product contained in the discharge manifolds of the loaded tank trucks is the same as that loaded.

3.4.2. Except for API gravity and visual checks for water and sediment, release of shipments shall not normally be withheld pending the completion of aforementioned tests. Tests shall be conducted with sufficient dispatch to permit recalling the shipment prior to unloading at destination.

3.4.3. The corrected API gravity shall be provided by the contractor and shall be shown on the loading document.

3.4.4. QARs at the prime contractor's facility should review any purchase orders and/or subcontracts to determine if conditions exist where PQA at subcontract level may be required per DLAM 8200.1, subsection 5.100.

3.5. INSPECTION OF PACKAGED PRODUCTS

The QAR will perform CQA functions IAW DLAM 8200.1, and as indicated herein. DGSC contracts for packaged petroleum products contain MIL–I–45208 quality requirements and MIL–STD–290 marking requirements. Any deviations to these requirements must be authorized by DGSC contracting officers on a contract–by–contract basis. The DGSC Quality Directorate will issue Quality Assurance Letters of Instructions (QALIs) to impose mandatory inspections on the QAR when quality history, new products, significant changes to products, and as other such factors dictate. Packaging, packing, and marking operations are of such complexity as to present many opportunities for error and therefore the QAR should assure the contractor inspection system provides for:

3.5.1. Inspection of containers and packaging materials to be used to determine and assure contractual conformance. When manufacturers'certificates are accepted as quality evidence, receiving inspection will be conducted as necessary to verify the accuracy of the certificate.

3.5.2. Assure that damaged containers are not used.

3.5.3. Assuring the interior condition of containers will not cause product contamination.

3.5.4. Inspection of markings to be applied to containers and packing and verify correctness prior to use, and also assure that marking materials are as specified and are properly applied.

3.5.5. Assure that product in bulk storage destined for packaging has been fully tested and conforms to the specification.

3.5.6. Inspection of the filling system prior to the commencement of filling operation. The QAR will assure the entire filling system from bulk storage to fill spout contains the proper product, free of moisture or other contaminant, and isolation measures have been taken to prevent contamination during filling. The QAR will observe the taking and testing of samples from fill spouts and first containers filled to assure conformance. The QAR will also verify that containers are filled to the proper quantity; all markings are correct; closures and seals are properly applied and effective;leaking containers are detected and removed; container exterior surfaces are such that cartons will not be unduly soiled; that cartons are properly filled, closed, and contents held snugly; and traceability is evident from product to testing results to enable problem resolution and corrective action, when required.

3.5.7. Periodic observations, sampling, and testing throughout the filling operation. As a minimum, the QAR should verify fill line spout and first container sample and test in addition to composite testing for product lot acceptance.

3.5.8. Assure that drummed and packaged products awaiting shipment are stored in such a location and manner that contamination or weather damage will not occur. Outside storage is to be avoided if possible; however, should it be necessary, appropriate measures to prevent contact with rain or moisture will be taken. If this is not feasible, and exterior cartons are still in acceptable condition and, if not overpacked, samples will be taken from a representative number of containers and analyzed for moisture and contamination.

3.5.9. Proper loading, blocking, and bracing of boxcar and truck loading are critical factors in the delivery of acceptable packaged materials. The QAR will periodically assure that the contractor's performance in this area is in conformance with contractual requirements on both origin and destination deliveries.

3.5.10. Carload and truckload shipments of packaged products will be effectively sealed prior to shipment with numbered seals furnished by the contractor. Seal numbers will be indicated on the Government bill of lading or other shipping documents.

3.6. GREASES

3.6.1. The inspection requirements necessary at facilities that package are the same as those for other products except for the following:

3.6.1.1. Testing of product in bulk storage is not required to be witnessed prior to commencement of filling operations. The composite sample made from the container samples must be made IAW ASTM D4057, section 8.1.7.9, unless otherwise specified in the contract.

3.6.1.2. The usual requirement is for the sample to be taken after it has remained in the container for 12–16 hours. Test results must meet both conformance test requirements, and any variance parameters from the qualification results as outlined in the product specifications.

Section 4
TANKER AND BARGE SHIPMENTS AND RECEIPTS

4.1. GENERAL

Movements of petroleum products by tanker and barge require the presence of the QAR/QSR during loading and unloading to ascertain and assure quality and quantity of product. Where shipment is made by Government–owned, operated, or chartered equipment(original acceptance), the QAR/QSR will determine and assure both the quality and quantity of product lifted. On destination acceptance deliveries, the QAR/QSR at the loading point is responsible for the determination of quality only. This quality determination will include a preloading inspection of the vessel by the QAR/QSR to determine its suitability for loading, as well as observing cargo

sampling and assuring specification conformance of the product loaded. On destination acceptance deliveries, if the QAR/QSR considers the vessel unsuitable to load and the contractor elects to load, the QAR's/QSR's observations will be furnished the destination QAR for his guidance. DD Form 250–1 for tanker and barge destination acceptance deliveries (quality only inspection) will be prepared in the same manner as for origin acceptance shipments except that the quantity figures will be obtained from the contractor and indicated in block 25 as "estimated." Block 28 will be annotated "Inspected for Quality Only." Preparation and distribution of documents will be in accordance with DoD FAR Supplement, Appendix I. Normally, the QAR/QSR can provide the necessary quality or quantity assurance by witnessing key functions during the initial and final stages of the loading or unloading;however, it must be recognized that peculiarities of a particular movement may necessitate additional on–the–spot Government inspection. Tankers and barges will be inspected promptly on arrival in order to avoid demurrage. Vessel cargo tanks will be inspected as soon as possible after conclusion of deballast operations, even if the cargo is not available. (For JP–7/JPTS, see paragraph 4.12.)

4.2. NOTIFICATION CONCERNING TANKER AND BARGE LIFTINGS AND DISCHARGES

The DFSC furnishes advance information to the cognizant quality offices of impending liftings of petroleum products in tankers and barges. The notifications contain essential information, including, in the case of overseas shipments, designation of the applicable Joint Petroleum Office(s). Notifications of any changes in the original lifting schedule are furnished as such changes occur. However, QARs/QSRs will maintain liaison with the refinery, terminal, and the vessel's agent or barging company to determine more definitive ETAs. In the case of domestic shipments, copies of communications concerning impending liftings are also furnished to the administrative office concerned at destination. Any unusual delays encountered in connection with loading or unloading of the vessel after its arrival at the facility and all vessel rejections will be promptly reported to DFSC. The MSC will also be advised when their equipment is involved, per the instructions contained in paragraph 1.2.6. of this manual.

4.3. INSPECTION PROCEDURES FOR TANKERS WITH INERT GAS SYSTEMS (IGS)

4.3.1. Inspection procedures for the loading and discharging of IGS tankers present special problems for QARs/QSRs due to limitation on access to vessel's cargo tanks. As a result, gauging, sampling, and visual tank inspections are affected. The QARs/QSRs at the first loading port shall inspect the entire gas–free IGS tanker for suitability to load. For IGS tankers, this visual examination is final, since for safety reasons QARs/QSRs subsequent loading ports cannot be permitted to enter any cargo tanks. Because of varying IGS tanker configurations, for example different measuring and sampling equipment and different types of ballast systems, specific vessel inspection instructions will be issued by DFSC to cover any requirements that are different from the mandatory inspection procedures contained in this manual. Since dock time is "money,"contractors might choose to inspect a vessel at some point other than their facility to expedite inerting. If this occurs, the QAR/QSR will make the vessel inspection concurrently with the contractor, at the contractor's chosen location.

4.3.2. The following instructions pertain to the MV Falcon Leader and MV Falcon Champion, which are on long–range charter to MSC.These procedures apply only when the vessels are utilizing their IGS.

4.3.2.1. The following gauging, temperature, and sampling equipment are installed on the Falcon Leader and Falcon Champion.

4.3.2.1.1. Marine Moisture Control Co. (MMC), Model S Vapor Control Valve which permits direct access to an inerted tank with special MMC gauging, temperature, and sampling equipment.

4.3.2.1.2. MMC sonic ullage probe and ullage–interface probe which measure product ullage and water level. Product ullage accuracy is plus or minus one–eight inch. However, MSC has informed DFSC–Q that the sonic probes will only measure product and water levels greater than one and one half inches. Therefore, checks for residual product and all checks for water should be accomplished using tape and bob/rod with water/product paste. Except when tanks are gas free, visual examination of tanks are not possible.

4.3.2.1.3. MMC portable temperature tape with digital crystal display.The technical literature states this probe is accurate to 0.5 degree F, (0.2 degree C) and permits readings at any desired height.

4.3.2.1.4. MMC portable sampling tape with sampling container which is capable of providing representative samples at any height.

4.3.2.2. Mandatory inspection procedures remain the same as vessels without IGS with the exceptions noted below:

4.3.2.2.1. Loadings. Cargo tank preparation cleaning requirements contained in table II must be met for all loadings.

4.3.2.2.1.1. Single Port Loadings. The tanker will arrive at the loading port gas free in order to permit QAR/QSR entry and inspection of all product tanks.After loading, product ullages are to be taken using the MMC sonic probe. However, as stated in section 4.3.2.1.2., because the sonic ullage–interface probe will only measure water levels greater than one and one–half inches, post–load water cuts must be taken using a tape and bob/rod. As with the sonic probes, the MMC control valve will be used to access the tank.

4.3.2.2.1.2. Multiport Loadings. As for the single–port loadings, the vessel will arrive at the first port gas free. As with current procedures, the QAR/QSR at the first port must inspect the entire vessel for suitability to load. This inspection is now more critical as QARS/QSRs at subsequent loading ports will not be able to enter tanks due to safety considerations. Prior to loading at these intermediate ports, inspection of empty tanks will be limited to checking for residual product and water that may have leaked from other systems. Because of the limitation of the sonic probes when checking low levels, this check must be accomplished using a bob/rod and paste. It is emphasized that under no circumstances are QARs/QSRs to enter tanks at intermediate loading ports. (For JP–7/JPTS, see paragraph 4.12.)

4.3.2.2.2. Discharges. Prior to discharge, product is to be ullaged utilizing the sonic probe and water checked using tape and bob/rod. After discharge, dry tank inspection must be performed using tape and bob/rod with product paste as visual examination of tanks is not possible.

4.3.3. Dry Tank Inspection of Inerted Tankers. Since tankers equipped with IGS cannot be visually examined after discharge to ascertain dry tank condition, but can only be checked through the vapor control valve with rod and product paste, the following qualifying statement should be placed on any "Dry Tank" statement that an IGS tanker representative might request a QAR/QSR to sign: Due to the inert gas system, vessel tanks cannot be visually examined to completely ascertain dry tank condition. Tanks were checked with rod and paste and the followingresults obtained (indicate tank numbers and remaining on board volumes if applicable). Draft of vessel at time of inspection was (indicate fore and aft draft).

4.3.4. SAAB Tank Radar, Model M Ullaging Device. The following procedures are to be used for ullaging tankers equipped with SAAB, Model M:

4.3.4.1. The device may be used for determination of vessel quantity, except in the following cases:

1. If device is suspected of being faulty, ullages will be taken manually.

2. If the shore–to–ship (after loading)/ship–to–ship (prior discharge) comparison varies by more than the current established allowable loss/gain allowance (i.e., 0.5%, 0.3% respectfully) take ullages manually.

4.3.4.2. If suspected of being faulty, the device can be checked by the following procedure:

1. Request vessel officer to turn–off the "corrected ullage compensation switch," located near the control display.

2. Take manual ullage through the plug hole located on the suspect tank device. The ullage, and the one shown on the display, should match within plus or minus one sixteenth inch. NOTE OF WARNING: Step (2) cannot be performed unless the plug hole in the device is equipped with a vapor control value, or the tank is not pressurized (i.e., inerted). DO NOT, REPEAT, DO NOT attempt to open plus if tank is pressurized (inerted).

4.3.4.3. If at all possible, manual ullages should be taken while vessel is still inerted. If vessel is inerted, but does not have vapor control valves, request that the vessel de–inert prior to manual ullaging.

4.4. PRELOADING INSPECTION OF TANKERS

The QAR/QSR will assure that the following precautions have been taken prior to approving tankers for loading:

4.4.1. Vessel conditioning has been performed in accordance with guide for table II, Preparation of Cargo Tanks.

4.4.2. It is the contractor's responsibility to inspect all shipping conveyances prior to loading to determine that they are suitable for intended use unless exception is taken in the contract.Inspection will include entering and thoroughly inspecting each tank for compliance with the cargo preparation guide contained in table II. The QAR/QSR will personally enter and inspect each tank to verify suitability to load. The above procedures are not to be construed as precluding additional tank inspection whenever the suitability for intended use is suspect. Prior to entering any tank for inspection, the QAR/QSR shall assure that necessary safety precautions have been taken and that each tank has been properly gas–freed, tested, and certified by qualified personnel. If tanks are coated, the type must be listed in the latest edition, under class 1 or class 4, of the Qualified Product List (QPL) 23236, for Paint Coating System, Steel Ship Tank (MIL–P–23236). The QAR/QSR will satisfy himself that he has taken all reasonable precautions to determine that in his opinion the vessel is suitable to load. In cases where cargo tanks have been partially filled at a previous lifting point and are to be topped–off, the product should be sampled and tested as deemed necessary by the QAR/QSR prior to topping off. Other cargo tanks which have been loaded at a previous port and which are adjacent to the tanks to be loaded should be sampled and samples held for testing in the event of loading difficulty pointing to possible cargo commingling. In the event that the vessel is rejected at the initial loading port, the QAR/QSR at subsequent loading port(s) will be advised by appropriate means that the vessel will be delayed. All products aboard the vessel including bunker tanks shall be gauged before and after loading, unless otherwise directed. (For JP–7/JPTS, see paragraph 4.12.)

4.4.3. Where considered necessary, and under safe conditions, the QAR/QSR will require that samples of the rust be taken from selected cargo tanks and tested with the product to be loaded or a similar solvent to determine the effect upon the corrosiveness and gum characteristics. The rust will be pulverized and added to a sample of the product to be loaded, or a similar solvent, in proportions of 5 to 10 grams of rust per 100 ml of the liquid. After shaking the mixture vigorously for at least one minute, it will be filtered free of rust and examined for color and for corrosion and residue, as required by the product specification. Loading plans will be reviewed to assure feasibility, giving consideration to bulkheads, lines, tanks capacities, and ship's trim. In the case of split cargos, the QAR/QSR must assure that the vessel is structurally suitable for handling two or more grades of product simultaneously without contamination; that bulkheads are secure; and that the vessel has double valve separation or line blanks. If valves are used, such valves will be lashed and sealed in proper position to ensure against misuse.

4.4.4. When a tanker is scheduled for multiple port loading, the QAR/QSR at the first loading point will inspect, if practicable, all of the ship's cargo tanks to determine their suitability for the scheduled products. (See paragraph 4.3 above for information on IGS tankers.) Tankers will not be approved for loading part of the cargo, unless all cargo tanks are considered suitable for the respective products. This does not preclude rejection by QARs/QSRs at subsequent loadings points, if conditions appear to warrant such action.
Table VI contains testing requirements. For loading–on–top testing, experience should be the guiding factor. For example, retest those characteristics that were marginal at the original loading port. Also, if a QAR/QSR knows a certain characteristic is normally marginal at his facility, then the QAR/QSR should test the product on board for that characteristic prior to loading on top.This will provide a quality reference for that characteristic. The QAR/QSR should have the expertise and experience to fit the circumstance. (For JP–7/JPTS, see paragraph 4.12.) However, B–1 type testing should be done as a minimum.

4.4.5. On occasion, bulk lubricating oil is transported by tanker-.Since Government–controlled tankers do not have tankage dedicated to lube oil service, each loading must be planned as to tankage to be used, system of loading and discharging, isolation of systems, and preparation of cargo tanks prior to loading product. The QAR/QSR will be furnished all loading instructions on a case–by–case basis.

4.4.6. Vessel movements will not be expedited at the expense of quality or quantity determinations, regardless of pressure or protests. Full support will be given the QAR/QSR for legitimate actions taken to assure quality and quantity.

4.4.7. The QAR/QSR should be alert to all conditions contributing to delays in port which increase loading or discharge time or may have a bearing on the proper assessment of lay time. This information will be recorded on the DD Form 250–1.

4.5. PRELOADING AND LOADING INSPECTION OF MOTOR VESSELS AND BARGES

4.5.1. The inspection procedures and precautions applicable to the handling of tankers will be applied to motor vessels and barges to the extent applicable and feasible. It is recognized that machine washing may not be practicable in every situation. In such cases, the QAR/QSR may permit cleaning by other methods which will render the equipment acceptable for the intended cargo.

4.5.2. Table II, Guide for Preparation of Cargo Tanks, was developed to prevent the loading of fuel into tanks which contain product residue from the previous cargo that could cause a serious contamination problem; however, the following flexibility is permitted for the loading of barges: Note: As used here, a barge is any vessel with less than 30,000 barrel capacity. Any vessel larger than 30,000 barrel capacity shall be prepared IAW table II, and will be inspected by tank entry. JP–4 may be loaded when the last product carried was JP–4, Avgas, Mogas, JP–5, or Kerosene and the tanks have been prepared in accordance with table II, A–1 instructions. For JP–4 cargos following leaded Mogas or Avgas, the B–1 tests run on the barge sample will include a test for lead content. JP–5 or diesel fuel may be loaded when the last cargo carried was JP–5 or U.S. Government specification diesel fuel (F–76/VVF800) and the tanks have been prepared in accordance with table II, A–1 cleaning instruction. Unless exception is given in the contract, final acceptance of the barge for cleanliness and product compatibility is the responsibility of the Government QAR/QSR. However, the contractor is also responsible for inspecting the conveyance for suitability to load.

46. INSPECTION PROCEDURES FOR LOADING OF TANKERS AND BARGES

4.6.1. Product quality will be assured in shore tanks and all lines used in loading. In the case of shore tanks, the QAR/QSR will obtain samples and witness appropriate verification tests of product which was previously sampled and tested by the contractor but not witnessed by the QAR/QSR (see paragraph 6.1), or when batch test results are considered out of date. At the start of loading, displace a sufficient amount of product through pipeline system into one cargo tank in the vessel. The ship's officer will then be requested to switch from this tank to other tanks and continue loading. A sample will be drawn from the first tank and check tests performed to determine that the quality of the product being loaded is satisfactory. Further sampling and testing will be conducted to the extent

determined to be necessary by the QAR/QSR. If at any time during loading there is an indication of contamination, the loading operation will be stopped until the cause and extent of same has been determined. A composite sample should be taken at the dock header during loading as an aid in determining the source (vessel vs. shore) of contamination, should such occur. When loading jet fuel or kerosene, loading and inspection procedures will be modified to the extent necessary to comply with the requirements for safe handling of jet fuels and kerosene as contained in COMSC Instruction 3121.3C, Tanker Operating Instruction (TANKOPINS). Significant procedures follow:

4.6.2. Prior to loading, all lines will be dropped and water removed from cargo tanks.

4.6.3. Initial loading will be at a rate not in excess of three feet per second (about 1,500 barrels per hour through a 12–inch line) through loading lines into the cargo tanks until the discharge outlet has been covered by at least three feet of product.Thereafter, the normal loading rate may be resumed. The loading rate of three feet per second applies to the flow into each tank. The total loading rate will not exceed the sum of the allowable rates for the individual tanks being filled. If there is evidence of turbulence or splashing in a cargo tank after the discharge outlet is covered by the specified three feet of product, the reduced loading rate will be continued until turbulence ceases. To determine an approximate rate flow equal to three feet per second, use the formula BPH =D2 10.49 where:

BPH = Barrels per hour
D = Diameter of the loading line
10.49 = Distance, time and volume factor

Example: Approximately how many BPH is equal to three feet per second for JP–4 flowing through a 12–inch line: D2 (12xl2)=144xl0.49 =1510.6 BPH or approximately 1,500 BPH. 'Tank cushioning information will be annotated on the DD Form 250–1 to include cushioning loading rate, volume loaded at the reduced rate, normal loading rate, and total calculated time difference between cushioning time and time it would have taken to load at the normal rate.'

Note. If calculations are not possible due to unknowns, i.e., pipe sizes, have shore load by gravity until amount specified above is loaded, then commence with pumps. The final determination of safe loading rates is a responsibility of the vessel. The QAR/QSR does not have the responsibility of physically loading any vessel. This should be kept in mind at all times.

4.6.4. Samples, ullages, water soundings, and temperatures will be taken from cargo tanks. These operations should not be performed until the static charge has been allowed to dissipate for a minimum of 30 minutes after loading to the tank has stopped.

4.6.5. Where required, precautions will be taken to maintain an adequate electrical grounding of the vessel to the dock during loading.

4.6.6. The QAR/QSR will participate in key operations in cargo loading, including the following:

4.6.6.1. Sampling, testing, and approving of shore tank contents prior to loading aboard the vessel.

4.6.6.2. Checking the cargo layout and loading plan. The QAR/QSR and the master of the vessel (or his designated representative) must concur on the cargo layout and loading plan. If any difference cannot be resolved locally, it will be referred to MSC.

4.6.6.3. Inspection and approval or rejection of the vessel and individual cargo tanks, including checking the ship's log on nature and previous cargos and leaks. Prior to loading jet fuel, tankers and barges must have the tanks receiving the fuel stripped and mucked to ensure removal or residual contaminants and moisture. On rejected MSC controlled tankers, reporting should be as outlined in paragraph 1.2.6. These reports will be made by the QAR/QSR regardless of reporting by other activities and will include, in addition to the reason for the rejection, the QAR's/QSR's opinion as to the feasibility of the vessel being cleaned to acceptable standards. If it is determined feasible to clean, the ship will clean until inspection indicates that acceptance standards have been met. The QARs/QSRs should require that all unsatisfactory cargo tanks be cleaned before the ship is again presented for acceptance inspection. Cleaning and reinspection should not be performed on a piecemeal basis. If, on a designation delivery cargo, contractor elects to load a ship which is considered unsuitable by the QAR/QSR, this fact will be communicated to the intended consignees as expeditiously as possible. This information will also be annotated in block 28 of the DD Form 250–1. On FOB origin shipments, vessel's bunker tanks will be gauged before and gauges will be kept by the QAR/QSR in vessel loading records for possible use in loss investigations.

4.6.6.4. Checking of loading lines to determine that they are properly isolated and do not contain product detrimental to the cargo.

4.6.6.5. Witnessing opening and closing shore tank gauges-.Representatives of the vessel may participate in this operation.Using shore tank gauges, the QAR/QSR will independently compute the quantity of petroleum products loaded on board vessels.

4.6.6.6. Determining the position of the swing line, where applicable, in the shore tank and setting at a position to prevent the withdrawing of any sediment or water that may have escaped the water draw off operation.

4.6.6.7. Closing and sealing of sea suction and overboard discharge valves prior to loading, and in the case of split cargos, sealing those valves essential to cargo isolation on the vessel with numbered seals furnished by the contractor and recording seal numbers on shipping papers. (For JP–7/JPTS, see paragraph 4.12.)

4.6.6.8. When applicable, perform sufficient tests on cargo loaded aboard ship at previous ports to confirm quality and assure that it will not adversely affect the product being loaded into the same cargo tanks. (For JP07/JPTS, see paragraph 4.12.)

4.6.6.9. Checking and analyzing line and dock header samples to verify quality of product moving to the vessel. Samples will be taken under line flow conditions.

4.6.6.10. Sampling and testing of vessel's cargo during and after loading. In accordance with table VI. (For JP–7/JPTS, see paragraph 4.12.)

4.6.6.11. Taking of temperatures, ullages or innages, and water soundings after loading; also calculating cargo quantity from vessel calibration tables for comparison with shore tank quantity figures-.Differences between ship and shore figures which are in excess of 0.5 percent will be investigated by the QAR/QSR prior to release of the vessel. Such investigations will include regauging shore tanks and vessels, recalculating quantities, rechecking gauging equipment, and thermometer. Floating roof tanks will be checked to determine if gauges were taken when roof was in critical zone. If no discrepancies are found, a notation will be made in the remarks block of DD Form 250–1 that such an investigation was conducted.Gross and net vessel figures will be shown on DLA Form 1726, Marine Ullage Report, and DD Form 2479, Barge Ullage. Preparation of these ullage forms is self–explanatory. On crude oil cargos, see paragraph 12.7 for information on ullage record requirements. (For JP–7/JPTS, see paragraph 4.12.)

4.6.6.12. Verification of amount loaded and final approval of cargo.

4.7. INSPECTION OF LOADED TANKERS AND BARGES

The QAR/QSR will be present during final loading operations and personally witness the sampling, gauging, temperature determination, and water cuts on the vessel's tanks as soon after loading as is safe on completion of static dissipation. Barges and tankers will normally be loaded within plus or minus 10 percent of the quantity stipulated in the loading instructions, unless the notification received specifically restricts the quantity to be loaded. Cargos outside the 10 percent permissible variation must be approved by the applicable ordering activity. Barge and tanker cargo quantities will be based upon shore tank gauges witnessed by the QAR/QSR. Vessel tanks will be gauged, checked for water, sampled, and checked as to temperature and witnessed by the QAR/QSR. After completion of loading a partial cargo, all empty compartments on the vessel will be visually inspected to assure there has been no leakage between

compartments. Cargo samples will be tested to the minimum mandatory requirements of table VI. The QAR/QSR may require additional testing if the situation so warrants. The post–load tanker sample results will be shown on the DD Form 250–1 unless directed otherwise by special instructions. In the event that after loading, there are indications of water or other contaminants, the QAR/QSR will take action to correct this condition. If possible, water will be stripped ashore before the tanker is released. If this cannot be accomplished, the tanker master will be advised to strip all water into one compartment, thereby assuring the delivery of clean, dry, specification product to the receiving vessel(s). If above procedures cannot be followed, DFSC and MSC will be notified by most rapid means of communication. (For JP–7/JPTS, see paragraph 4.12.) All above actions shall be documented on the DD Form 250–1.

4.8. INSPECTION PROCEDURES FOR UNLOADING OF TANKERS AND BARGES

4.8.1. Initial Examination. Numbers on seals used for split cargo isolations and on sea suction and overboard discharge valves will be verified by the QAR/QSR before and after discharge. Before unloading of the vessel is started, all–level samples will be taken from each cargo tank.Each sample will be examined. In the case of split cargos, different products in adjacent compartments or in adjacent cargo systems(different products should not be in the same system) will be tested as necessary to determine if commingling has occurred. Samples will be composited for further examination and retention as specified in paragraph 6.5. Approval for discharge will be given if the preliminary examination indicates that the cargo is in order. If the examination indicates that the cargo is not suitable, the QAR/QSR will immediately contact his administrative quality assurance office to obtain instructions.

4.8.2. Ullages and Innages. Gauges, temperature, and water soundings on cargo tanks of the vessel will be taken and made a matter of record. Figures will be compared with those obtained at the loading point for indications of quality and quantity deficiencies. At intermediate discharge ports , all products will be gauged before and after discharge. If variations of 0.5 percent or greater are indicated by ullage or innage on an individual barge gauging, comprising a shipment of two or more barges, that barge will be discharged individually and separate shore tank gauges taken. All other barges may be discharged at one time or as the situation permits. (For JP–7/JPTS, see paragraph 4.12.)

4.8.3. Other Operations. The QAR/QSR will participate in key operations specified in paragraph 4.6.6. as applied to cargo discharging. Quantities received will be based on shore tank gauges witnessed by the QAR/QSR.

4.8.4. Unrecoverable Product. In the case of Government–owned product remaining after unloading of the vessel is completed, the QAR/QSR will examine each cargo tank of the vessel to determine if any product remains therein. If no significant quantity of product remains in the cargo tanks, the QAR/QSR will sign and retain a copy of the dry tank certificate. Cargo tanks containing appreciable amounts will be gauged and amounts present determined, if possible, by using applicable capacity tables. If it is impossible to obtain accurate figures, estimates will be made. The QAR/QSR will assure that all attempts are made to strip cargo tanks of product. It is recognized that it is not possible to strip a vessel totally dry due to normal operational constrictions. An appreciable amount of product would normally be any quantity estimated at over 15 barrels on a tanker and 5 barrels on a barge. Figures obtained, estimates made, cargo tank numbers involved, and pertinent information on reasons for incomplete discharge will be entered on the DD Form 250–1 and DLA Form 1726. In the case of barge discharges, a notation will be placed on the form as to whether barge or shore pumps were used to discharge the cargo.

4.8.5. Release of Tanker/Barge by QAR/QSR After Discharge. To minimize unnecessary demurrage costs after a tanker/barge discharge, the QAR/QSR should release the vessel prior to gauging of shore tanks and after completion of requirement post–discharge vessel inspection requirements, including:

4.8.5.1. Completion of thorough dry tank inspection of entire vessel(cofferdams, etc.) including determination of any residual product as directed in paragraph 4.8.4. On FOB origin shipments, vessel bunker tanks will be gauged after discharge, unless otherwise directed, and gauges retained by QAR/QSR for possible use in loss investigation.

4.8.5.1.1. Product and water gauge measurements, product temperature, gross volume of individual compartments, and net volume of total cargo by grade.

4.8.5.1.2. Signature of vessel master or mate.

4.8.5.1.3. Signature of QAR/QSR or other onsite U.S. Government representative.

4.8.5.1.4. Volume of any carry–away product after final discharge of cargo.

4.8.5.1.5. Adjustments for trim of vessel as reflected on calibration charts.

4.8.5.2. Gauging, volume determination and ullage form completion if at an intermediate discharge port. If comparison of pre–discharge and post–discharge vessel volume figures indicate possible leakage/contamination of cargo remaining on board, the QAR/QSR will investigate prior to releasing the vessel. (For JP–7/JPTS, see paragraph 4.12.)

4.8.5.3. After verifying no pumpable product remains, insure cargo hoses are removed to prevent possible product backload. Any delay in cargo hose removal will be documented on the DO Form 250–1.

4.8.5.4. Completion of the DD Form 250–1, except for block 25, Statement of Quantity. For vessel purposes, the DD Form 250–1 is considered complete when the block 27, Time Statement, is completed as the vessel representative does not sign for quality of quantity but is responsible for the Time Statement only.

4.8.5.5. If shore figures are available after vessel release but prior to vessel departure, those figures will be provided the vessel. Otherwise, the shore figures will be provided the vessel's agent for forwarding to the ship.

4.8.5.6. It is emphasized the above procedures refer to post–discharge operations only. The paragraph 4.6.6.11 QAR/QSR requirements to perform shoreside calculations after loading, including investigation of volume differences between ship and shore exceeding 0.5 percent prior to releasing a vessel, remains in effect.

4.8.5.7. Losses/Gains. Shipping and handling variations in excess of those indicated in DoD 4140.25–M will be detailed by the destination QAR/QSR on the DD Form 250–1. The destination QAR's/QSR's remarks concerning the variation will be confined to observations and evaluations made at the receiving terminal. Tank gauges, line capacities, and all quantity determinations will be checked to the extent necessary in attempting to account for variations. If the variations cannot be accounted for at the final discharge point, the QAR/QSR will immediately request the QAR/QSR at the loading point(and simultaneously the QAR/QSR at each intermediate discharge point if same exists) to investigate possible reasons for the variation.Each QAR/QSR queried will advise the final destination QAR/QSR of his findings. Since these reports may be used as exhibits to Reports of Survey involving pecuniary liability and responsibility, the statement of the investigating QAR/QSR will be signed by him, as having personal knowledge of the facts concerned therein. Advice pertaining to final results of his study should be made by message to the destination QAR/QSR with written findings following. If the origin QAR/QSR is no longer available and the inquiry is conducted by another person, that person will sign the report of investigation. If appropriate, statements should be obtained from witnesses and/or other personnel who may have pertinent evidence relating to the variation. The final destination QAR/QSR will consolidate the data and forward same to the accountable property officer. Corrected DD Form 250–1 will be made as appropriate.

4.9. SUBMISSION OF MSC TANKER OPERATIONAL REPORTS

The single manager for Ocean Transportation (AR 55–361JOP, NAVINST 4020.22A; AFR 75–27; MCO 4600.28; DLAR 4500.22)

contains instructions for the preparation and submission of the operational reports.

4.9.1. Message reports of routine procedures should be used unless tanker schedules or other operational conditions dictate otherwise.

4.9.2. The master of a vessel may be requested to transmit the report data when Government message communications are not readily available.

4.9.3. Reports will be submitted by air mail only when minimize conditions preclude electrical transmission.

4.10. FORMS AND REPORTS FOR TANKER AND BARGE LIFTINGS AND DISCHARGES

4.10.1. Care will be exercised when reviewing DD Form 250–1.Detailed instructions covering the preparation and distribution are contained in DoD FAR supplement and reproduced in DoD 4140.25–M and ELAM 8200.1. Particular attention should be given to the entries made in item 27, Time Statement, and item 28, Remarks. Information as to notice of readiness to load, time vessel moored alongside, all delays, cause, and responsible parties, product losses, product ownership, and seal numbers is used to determine liability for product losses and any resulting demurrage. In the event of multiport discharges of a cargo, the QAR/QSR at each intermediate discharge port will place a copy of his ship's ullage reports and DO Form 250–1 on board the vessel for each subsequent discharge port.If time does not permit placing DD Form 250–1 aboard vessel, the quantity discharged will be transmitted electronically to the QAR/QSR at subsequent discharge ports and the finalized copies of DD Form 250–1 will be mailed. DLA Form 1726 and DD Form 2479 for barges will be prepared by the QAR/QSR and used for recording and reporting vessel's ullage at loading and discharge ports and will be distributed with each copy of the DD Form 250–1. Occasionally, a vessel will be put into continuous service. During these times, the vessel will likely arrive at loading ports with product remaining on board from the previous cargo discharged. In this event, or any time a vessel arrives to load with product on board, the measurements, and corresponding quantities will be reflected on DLA Form 1726.These net quantities will also be annotated on block 28, of the DD Form 250–1. DLA Form 682, Worksheet for Calculating Quantity, will be utilized to record shore tank gauges and quantities at loading and discharge ports.

4.10.2. For FOB origin barge shipments, the reporting provisions contained in paragraph 4.1 also apply.

4.11. CUSTOMS CLEARANCE FOR OUTGOING AND INCOMING CARGOS

The U.S. Collector of Customs will normally require certification for clearance of outgoing and incoming offshore shipments of military petroleum products handled by commercial carriers. On outgoing cargos, the carrier is responsible for effecting customs clearance and will prepare the necessary documents. COMSC Instruction 3121.3C, Clearance of Vessels with U.S.Customs, outlines the procedure in detail. On incoming shipments from overseas points, CONUS QARs/QSRs are responsible for the preparation of the formal entry documents in accordance with FAR.

4.12. ULLAGING AND SAMPLING OF JP–7/JPTS AT INTERMEDIATE PORTS

It has been requested by the U.S. Air Force that once JP–7/JPTS is sampled, ullaged, temperatures taken, and water cut at original loading port, any future handling is to be kept at a minimum. In compliance with this request, the following should be implemented: After JP–7/JPTS is loaded and sampling/gauging procedures are completed, the ullage hatch shall be sealed. The product will not be sampled or ullaged again until reaching its final destination, unless there is a significant change in the ullages of other products on the vessel. If this is necessary, extreme care will be taken to assure cleanliness of sampling and gauging equipment used. A notation will be placed on DO Form 250–1, if this occurs.

4.13. SUBMISSION OF DFAMS REPORTS FOR FOB ORIGIN BARGE SHIPMENTS FROM A CONTRACTOR

When required by the contract, the contractor will report all FOB origin contractor shipment transactions to DFSC for recording in the Defense Fuel Automated Management System (DFAMS)within two working days of an action. The QAR/QSR will assure the contractor submits required DD Form 250–1 transaction data to the cognizant DFR via the fastest means of transmission available, e.g., telecopier, telephone, message, etc. Specific data to be furnished are as follows:

Table 4–1

DATA	DD FORM 250–1 BLOCK
A. National Stock Number	23
B. Quantity	25
C. Contract Number	6
D. Contract Line Item Number	22
E. Shipment Number/SUPAAC	11
F. Day Commenced Loading/Pumping	27 (line 8)
G. Bill of Lading (B/L) Number	12
H. Delivery Order Number	10
I. Final Shipment Indicator	28
J. Product Shipment–Day	27 (line 11)
K. Mode of Shipment	14

Section 5
PIPELINE MOVEMENTS

5.1. GENERAL

5.1.1. Both commercial and Government–owned product pipeline systems are employed in the movement of petroleum products by, or for, the Government. The risks inherent in the pipeline transportation of petroleum products are sufficiently great to require that each and every pipeline tender be controlled before, during, and after transmission to make certain that products conform to the required quality. The QAR/QSR will perform inspection over pipeline movements to maintain and assure quality and quantity of product tenders owned by or destined for the Government. The nature and extent of inspection performed is contingent upon the complexity of the pipeline system, applicable tariffs, contracts, and operating agreements.

5.1.2. During movement, product is normally separated by maintaining turbulent flow. Batching plug or suitable hydrocarbon buffer is also an acceptable method of separation as indicated in table III.

5.2. MOVEMENTS VIA COMMERCIALLY–OWNED SYSTEMS

5.2.1. Applicability. These instructions apply to all movements of product belonging to, or to be accepted by, the Government, except movements of contractor–owned product where quality is verified after receipt at a terminal, and prior to delivery to the Government.

5.2.2. Tariffs and Agreements. Carriers' tariffs outline the normal responsibilities of the pipeline company. Supplemental agreements are usually entered into between the Government and the carriers, which further elaborate on the extent of the carriers' responsibilities. Copies of these agreements will be made available to cognizant quality assurance offices by either the Defense Fuel Region or prime contractor as applicable QAR/QSR. The above documents will be reviewed by the QAR/QSR concerned and provisions thereof used in product quality assurance. If prime contractor user agreement with a carrier (subcontractor) prior to acceptance, prime contractor remains totally responsible for contract requirements.

5.2.3. Quality Assurance/Surveillance Procedures. QAR/QSR will:

5.2.3.1. On FOB origin and destination contracts, witness the sampling and full specification testing of each finished product to assure product tenders accepted by the carrier conform to the applicable contract requirement. The QAR/QSR will witness testing, IAW DLAM 8200.1, section 4, part 4, to substantiate the contractor's full specification test results.

5.2.3.2. On FOB destination deliveries, only heart cuts will be moved into the FOB acceptance tanks unless specific exception is authorized. The QAR/QSR will witness the sampling and testing of the receipt tanks prior to issue. Sampling and testings will be in accordance with table VI.

5.2.3.3. Perform surveillance over contractor operations to assure that the cutting of batches into pipeline receiving tanks is in accordance with the provisions of tariffs and operating agreements.Only heart cuts (product containing no transmix) or cuts complying with table IV will be moved into receiving tankage unless specific exception is authorized. The QAR/QSR shall witness the sampling and testing of the product prior to release. Testing will be in accordance with instructions contained in table VI. It is recognized that at many pipeline locations the witnessing of all batch cuts is not always necessary or appropriate in order to preserve a suitable level of protection. Therefore, latitude is given to perform procedures evaluation IAW DLAM 8200.1, section 4. However, when the batch is transferred from one pipeline system to another, PVI must still be performed.

5.2.3.4. Maintain familiarity with the procedures used by the carrier to protect or condition the pipeline interior. Assure that corrosion inhibitors added to products intended for military use are those approved for the product concerned. This is normally accomplished using procedures evaluation IAW DLAM 8200.1, section 4, part 3.

5.2.3.5. Evaluate transmixtures when required. The procedure for this evaluation, a suitable form for recording data, and a sample of the calculations involved are contained in tables IV and V respectively.

5.2.3.6. Maintain liaison with activities receiving product by pipeline, and render technical assistance as required.

Section 6
SAMPLING AND TESTING AT POINT OF SHIPMENT

6.1. GENERAL

6.1.1. Samples are representative quantities of economical and convenient size from batch, blend, level, or lot of material, taken for examination and test to determine the uniformity or average quality of the material. Lengthy, painstaking, and costly laboratory analysis may be rendered valueless by improper sampling procedures.Since acceptance of material depends upon the results of specification tests conducted on samples, it is of paramount importance that sampling be skillfully accomplished to ensure that the samples truly represent the product sampled. Petroleum products will be sampled in accordance with the applicable method of ASTM D–4057, Sampling Petroleum Products. Samples from each batch of material will be tested to determine conformance with specification requirements prior to release for shipment. It is the contractor's responsibility to offer specification product to the Government in accordance with terms of the contract. The QAR/QSR will witness initial sampling and testing performed by the contractor of a batch or blend IAW DLAM 8200.1, section 2, part 4.

6.1.2. Where products or additives are approved by contract for in–line blending, as opposed to batch blending, the QAR/QSR will thoroughly check the in–line blending systems and procedures and assure their capability to deliver specification product. Upon approval (paragraph 2.4.3.), these systems and procedures will be detailed in the contractor's written Quality program.

6.2. SAMPLING OF PETROLEUM PRODUCTS

6.2.1. Tanks are usually sampled at various levels, and tests are conducted on these samples to determine that the contents are uniformly blended. Tests for determining specification compliance will be performed on samples taken IAW ASTM D–4057, unless specifically authorized otherwise.

6.2.2. Tank cars and tank trucks will be sampled and tested in accordance with table VI instructions.

6.2.3. Tanker and barge samples will be obtained and tested in accordance with section 4 of this manual. (For JP–7/JPTS, see paragraph 4.12.)

6.2.4. Pipeline samples will be obtained and tested in accordance with ASTM D–4057 and table VI.

6.2.5. Sampling plans (section 3) will specify the number, frequency, and location of samples to be taken during drum and small container filling. These plans, to be acceptable, must require a sample from the filling line at the start of the operation, a sample from the initial drum or container tendered to the Government, with subsequent samples from the line and containers to be taken on a frequency that will be representative of the overall operation. The extent of testing on all of these samples will be detailed in the sampling plan and will include checks for water and other contamination.

6.2.6. Samples of greases for conformance tests will be taken only after the material has been placed in unit containers, LAW ASTM D–4057.

6.3. SPECIFICATION TESTING

Contractors supplying materials for military use are required by contract and specification provisions to provide necessary laboratory personnel and equipment for conducting specification tests. The QAR/QSR will assure compliance with the following requirements:

6.3.1. Each of the required tests will be conducted in accordance with the method specified in the applicable specification, except as otherwise provided in the contract.

6.3.2. Laboratory equipment will be in proper operating condition, and will meet the requirements specified in applicable test method.

6.3.3. ASTM, API, Federal, and equipment manufacturers specifications, standards, test methods, and instructions specify procedures for the calibration of equipment used for testing or measuring of petroleum and related products and will be followed.

6.3.3.1. All equipment applicable to the contract requiring calibration is subject to control whether located at the contractor's plant or another source.

6.3.3.2. The contractor's quality plan shall specify the types of measuring and test equipment to be calibrated to assure compliance with the contract.

6.3.4. Requirements, as established in the qualification test or as contained in the applicable specification, will be considered as absolute and will not be subject to change for tolerance of the test methods.

6.4. RESULTS OF TESTS

Contracts require that contractors maintain on file a complete record

of all tests accomplished on loaded conveyances and on filled shipping containers, as well as those on batches or blends. The QAR/QSR will maintain on file quality evidence of all materials shipped.

6.5. RETAIN SAMPLES

Retain samples will be taken from blends and incoming and outgoing shipping containers. Samples will be properly marked as to product, source, and date taken, and will be stored in a suitable place. Listed below are the recommended sample sizes and retention periods:

Table 6–1

Type of Container	Retention Period	Size
Tank Trucks and Tank Cars	As determined by the QAR/QSR but not to exceed 30 days.	1 quart
Tanker or Barge (Composite)	45 days at loading point. At destination, until quality is verified.	5 gallons
Packaged Materials	12 months. When product is packaged in a container of less than 10 gallons (fuel and lubricating oils) or less than 35 pounds (greases), the sample will be retained in the originally packaged container.	Sufficient sample to permit complete specification testing if required.
Blend or Shipping Tank	If batch is used in loading barges, tankers, or in pipeline movements, retain sample for at least 45 days, otherwise retain until batch or blend is depleted.	5 gallons
Pipeline	Until quality verification on receiving tank is completed.	Optional*

Notes:

* Unless otherwise specified in the operating agreement.

Section 7
SUBMISSION OF SAMPLES OF PETROLEUM PRODUCTS

7.1. GENERAL

Samples of petroleum products are submitted to a Government laboratory for one or more of the following reasons:

7.1.1. Aid the QAR/QSR in determining the reliability of the contractor's laboratory equipment and procedures by establishing the degree of correlation between the test results obtained at the contractor's laboratory and the Government laboratory.

7.1.2. Serve as a check on quality of products being furnished to, or stored for, DoD.

7.1.3. Referee decisions.

7.1.4. Assist a QAR/QSR located at other than petroleum contractors' facilities in determining that a contractor is supplying specification petroleum products.

7.1.5. Cyclic testing of Government–owned product to determine suitability for use and/or continued storage.

7.1.6. Determine if specific products comply with guarantee of warranty clauses of the contract.

7.1.7. When required by the contract.

7.2. SAMPLE SUBMISSION

7.2.1. General. It will be the responsibility of the contractor to ensure that samples are submitted in accordance with the terms of the contract and as outlined herein. Sample submitted to a Government laboratory for testing will be taken, identified, and prepared for submission under the direct supervision of the QAR/QSR. The contractor will accomplish DD Form 1222, Request for and Results of Tests, to accompany the shipment; the QAR/QSR must sign the DD Form 1222. Where appropriate, a statement will be placed on the test report that a sample was submitted to the Government laboratory. The identification will be shown on the sample identification tag, as well as on test reports and correspondence pertaining to the sample.If the sample represents a qualified product, the contractor's qualification number will be placed on the sample tag. Where remote locations are involved and transportation problems preclude timely submission of samples and receipt of test results, the QAR/QSR may, with permission from the contracting officer, utilize the services of commercial laboratories.

7.2.2. Frequency of Sample Submission. Samples will be submitted at the following specified frequencies for the purposes prescribed in paragraph 7.1.

7.2.2.1. Samples of one grade of aircraft fuel and one grade of aircraft lubricating oil will be obtained at 90–day intervals, and at least once during a contract period of shorter duration. These samples will be submitted to a USAF quality control laboratory from refineries furnishing the above products to the Government(including facilities at which preinspection is being conducted).Additional samples may be submitted at the discretion of the QAR/QSR.

7.2.2.2. Samples of any product will be submitted to a designated laboratory at any time specifically requested by a Military Department, DFSC, or DGSC.

7.2.2.3. Samples of any product may be submitted for a referee decision at any time deemed necessary by the QAR/QSR.

7.2.3. Mailing Addresses. Within CONUS, and unless otherwise designated, addresses of the various petroleum quality control laboratories of the Military Departments are as follows:

7.2.3.1. Army

Table 7–1

PFO–West	PFO–East
North Dakota, South Dakota, Nebraska Kansas, Oklahoma, Texas, and all states west thereof	Minnesota, Iowa, Missouri, Arkansas, Louisiana, and all states east thereof
Mail Address	**Mail & Freight Address**
USAGMPA Petroleum Field Office–West Laboratory Bldg. 247, STSGP–PW Defense Depot Tracy Tracy, CA 95376	USAGMPA Petroleum Field Office–East Bldg. 85–3, STSGP–PE New Cumberland Army Depot New Cumberland, PA 17070
Freight Address	
Transportation Officer Defense Depot Tracy FOR: FPO–West, Bldg. 247 Defense Depot Tracy Tracy, CA 95376	

7.2.3.3. Navy

7.2.3.3.1. Referee type samples (paragraph 7.2.2.4.).

Aviation Fuels. Forward samples and related correspondence to: Commanding Officer, Naval Supply Center, Petroleum Testing Laboratory (Code 702), Norfolk, VA 23512. Send a copy of the correspondence to Commanding Officer, Navy Petroleum Office (Code 40), Cameron Station, Alexandria, VA 22304–6180.

Aviation Oils. Forward samples and related correspondence to: Commanding Officer, Naval Air Propulsion Test Center (AE), Trenton, NJ 08628.

Aviation Greases, Hydraulic Fluids, and Specialty Products. Forward samples and copies of related correspondence to:Commanding Officer, Naval Air Development Center, Air Vehicles Technical Dept., Materials Lab (Code 30212), Warminster, PA 18974.

Boiler Fuels. Forward samples and related correspondence for boiler fuels, MIL–F–859, and MIL–F–16884 to Commanding Officer, Naval Sea Systems Engineering Station, Naval Base, Philadelphia, PA 19112.

Shipboard Lubricants. Forward samples and related correspondence to David W.Taylor Research and Development Center (Code 2832), Annapolis, MD 21042. Shipboard lubricants are restricted to products supplied under the following specifications:

Table 7–2

MIL–F–859	MIL–L–17331
MIL–F–16884	MIL–L–17672
MIL–H–19457	DoD–G–24508
MIL–L–9000	DoD–L–24574
MIL–L–15019	MIL–G–24139
MIL–L–15719	VV–L–825

7.2.3.3.2. Samples of products normally used by the Navy (paragraph 7.2.2.2.) and related correspondence will be forwarded to:Commanding Officer, Naval Supply Center, Petroleum Testing Laboratory (Code 702), Norfolk, VA 23512.

7.2.3.4. Air Force

7.2.3.3.1. Correlation samples and samples of products normally used by the Air Force from facilities located in the states of Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Nebraska, Ohio, Pennsylvania, South Dakota, Virginia, West Virginia, and Wisconsin will send correlation samples and samples of products (paragraphs 7.2.2.1. and 7.2.2.2.) to the following address:

Table 7–3

Freight Address:	Transportation Officer ATTN: SFTLA, Bldg. 70, Area B Wright–Patterson AFB, OH 45433–5000
Correspondence Address:	Energy Management Laboratory Det 13, San Antonio Air Logistics Centre/SFTLA Wright–Patterson AFB, OH 45433–5000

7.2.3.3.2. Correlation samples and samples of products normally used by Air Force from facilities located in the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, Connecticut, and New Jersey will send correlation samples and samples of products (paragraph 7.2.2.1. and 7.2.2.2.) to the following addresses:

Table 7–4

Freight Address:	Energy Management Laboratory Det 20, San Antonio Air Logistics Center/SFTLB Trundy Road, Bldg 14 Searsport, ME 04974–0408
Correspondence Address:	Det 20, SA–ALC/SFTLB P.O. Box 408 Searsport, ME 04974–0408

Correlation samples and samples of products normally used by the Air Force from facilities located in the states of Florida, Georgia, South Carolina, Alabama, Tennessee, North Carolina, Mississippi, Louisiana, and Arkansas will send samples to the following addresses:

Table 7–5

Freight Address:	Energy Management Laboratory Det 21, San Antonio Air Logistics Center/SFTLC Bldg. 1121 MacDill AFB, FL 33608–0051
Correspondence Address:	Det 21, San Antonio Air Logistics Center/SFTLC P.O. Box 6051 MacDill AFB, FL 33608–0051

Samples of all greases used by the Air Force, regardless of geographic origin, and correlation samples and samples of products normally used by the Air Force from facilities located in the states of Alaska, Hawaii, California, Nevada, Utah, Wyoming, Oregon, Washington, Idaho, North Dakota, and Montana, will be sent to the following addresses:

Table 7–6

Freight Address:	Energy Management Laboratory Det 35, San Antonio Air Logistics Center/SFTLD DFSC Terminal, Bldg. 1 Mukilteo, WA 98275
Correspondence Address:	Det 35, San Antonio Air Logistics Center/SFTLD P.O. Box 118 Mukilteo, WA 98275

Correlation samples and samples of products normally used by the Air Force from facilities located in the states of Arizona, New Mexico, Texas, Oklahoma, and Colorado, will send samples to the following addressees:

Table 7–7

Freight Address:	Energy Management Laboratory OL San Antonio Air Logistics Center/SFTLI Bldg. 837 Holloman AFB, NM 88330–5000
Correspondence Address:	Same as above.

7.2.3.4. Defense Fuel Supply Center. Samples will be submitted in accordance with instructions furnished with the request.

7.2.3.5. Defense General Supply Center. Samples will be submitted in accordance with instructions furnished with the request.

7.3. SAMPLE IDENTIFICATION, PACKING, AND SHIPPING

The QAR/QSR will assure that all samples submitted for testing are properly and adequately identified. Identification appearing on the sample tag and any related correspondence should include, as applicable, submitting activity and address, sample number, packaging date, batch or lot number, quantity represented by sample, product nomenclature, specification, grade or type, supplier's name and location, contract number, date sample was drawn, and type of test desired (identification, correlation, qualification, or other). Samples will be accompanied by DD Form 1222 and will be packed, marked, and shipped in accordance with MIL–STD–290. The cost of the sample shipping container and transportation will be borne by either the Government or the contractor in accordance with the terms of the applicable contract.

7.4. RETURN OF SAMPLE CONTAINERS

Empty sample containers will normally be returned to the submitter upon request. When request of containers is desired, the sample tag and DD Form 1222 shall so indicate. Sample containers will be returned to the submitter by express, charges collect.

7.5. RECHECK SAMPLES

The QAR/QSR submitting recheck samples will forward a letter

immediately to the laboratory, advising date and method of shipment and referencing the request for recheck sample, if applicable. Such letter will also adequately identify the sample originally submitted.

7.6. SIZE OF SAMPLES TO BE SUBMITTED

Following are recommended sample sizes. These quantities will be increased when the tests required under the individual product specifications dictate the need for a larger sample.

Table 7–8

Product	Size
Aircraft Reciprocating Engine Fuels	2 gallons
Aircraft Turbine Engine Fuels	5 gallons
Boiler Fuel Oil	5 gallons
Diesel Fuel Oil	5 gallons
Automotive Gasoline	1 gallon
Kerosene	1 gallon
Burner Fuel Oil	1 gallon
Lubricating Oils	1 gallon
Other Liquid Products	1 gallon
Greases	5 pounds (in original container if practicable)

7.7. MAINTENANCE OF SAMPLE RECORDS

The QAR/QSR will maintain a record of samples submitted to laboratories, to include sufficient information to completely identify samples.

7.8. FORWARDING OF TEST REPORTS

Reports of tests in connection with samples submitted to Government laboratories in accordance with paragraphs 7.1.1. and 7.1.3. will be as follows:

7.8.1. One copy to the Government testing laboratory to which the sample is forwarded.

7.8.2. On all samples of products normally used by the Army, one copy to Commanding Officer, U.S. Army General Materiel and Petroleum Activity, ATTN: STSGP–FT, New Cumberland Army Depot, New Cumberland, PA 17070.

7.8.3. The QAR/QSR submitting samples to a Government laboratory will be notified of the test results by the Government laboratory.When tests on Government–owned stocks are performed in a Government laboratory, that laboratory will make distribution of the test report. Unless there is a specific reason for not so doing, contractors should be apprised of the Government's test results on samples of their product.

7.9. SAMPLES FOR EXPERIMENTAL OR OTHER PURPOSES

The Military Departments may request, through proper channels, samples for experimental or other purposes. The QAR/QSR will comply with all such approved requests.

7.10. OVERSEAS SAMPLES

Samples generated in overseas areas will be forwarded to the appropriate laboratory in accordance with directives or instructions from the owning activity.

Section 8
QUALITY ASSURANCE OF PETROLEUM PRODUCTS SERVICED TO GOVERNMENT EQUIPMENT AT COMMERCIAL FACILITIES

8.1. GENERAL

Contracts are issued for the servicing of fuel and lubricating oil to Government–owned aircraft and vehicles at various commercial airports and automotive servicing facilities. The purpose of this section is to provide basic and standardized instructions and guidance for performance of QA actions at into–plane aviation fuel and aviation oil service contractors at commercial airports.

8.2. CONTRACTOR QUALITY ASSURANCE RESPONSIBILITIES

These responsibilities are delineated in the contractual document, and include providing and maintaining an inspection system acceptable to the Government. Under such system, it is necessary for the contractor to provide evidence of product quality by means of appropriate documents furnished by the supplier of the products, and to maintain product quality until delivery to equipment. In addition, the contractor's responsibilities in regard to aircraft servicing equipment and operations are prescribed in the additional general delivery conditions of DFSC into–plane contracts and MIL–STD–1548, Into–Plane Delivery of Fuel and Oil at Commercial Airports.

8.3. GOVERNMENT QUALITY ASSURANCE RESPONSIBILITIES

8.3.1. The wide distribution of these contractors and the relatively small QA workload normally associated with these individual facilities necessitates assignment of them to QARs of varied backgrounds. In order to assure compliance with contract requirements and standards, some basic guidance is needed to overcome the varied interpretations and degrees of application of the requirements by QARs. The special training course J07 (QA of Into–Plane Service Contracts) was established and is required for QARs responsible for into–plane facilities.

8.3.2. The QAR will visit the facility as soon after the award of a contract as is feasible to analyze the system and determine the adequacy of the facilities and quality assurance procedures. Results of the visit will be made a matter of record. This review and evaluation will be documented using criteria in DLAM 8200.1, section IV. Corrective action on all deficiencies should be initiated IAW DLAM 8200.1, part 5. PE will be accomplished at a frequency of no more than 90 days.

8.3.3. Samples of contract material should be obtained by the contractor from immediate airport storage facilities or servicing units during the initial survey and forwarded to a laboratory designated by the QAR for correlation testing. Further sample submission and frequency of product inspection system analysis will be as determined necessary by the applicable contract and/or QAR.

8.4. OTHER DOCUMENTS RELATED TO AIRCRAFT REFUELING

8.4.1. Procedures for refueling presidential aircraft, Air Force One, may be found in AFM 67–1, volume 1.

8.4.2. MIL–STD–1518, Storage, Handling, and Servicing of Aviation Fuels, Lubricating Oils and Hydraulic Fluids at Contractor

Facilities is the military standard that is normally referenced in aircraft overhaul facility contracts.

Section 9
PREAWARD SURVEYS

9.1. GENERAL

Preaward surveys are conducted to evaluate a prospective contractor's capability to perform under the terms of a proposed contract.

9.1.1. The QA participant in a preaward survey is a member of a survey team usually lead by the contract management representative.Prior to the survey, the team leader will review the role of each participant, and the scope and depth of the survey. This should eliminate overlapping of survey responsibilities; eliminate potential controversy concerning preparation of the survey report;avoid confusion in the presence of the prospective contractor's representatives; and contribute to the effectiveness of the survey effort. The survey will be a joint team effort whenever possible.When this is not possible, QA actions shall be coordinated with the team leader.

9.1.2. The QA survey report and recommendation are combined with other functional surveys reports in making a composite recommendation to the contracting office requesting the survey. The QA survey information will also be used in conducting future preaward surveys, postaward orientation conferences, and in highlighting significant quality areas to be covered by the contract QA program.

9.1.3. It is essential that technically qualified personnel conduct the surveys, and that these evaluations are adequate to assure proper conclusions and recommendations. Survey reports must be completed and technically accurate to be effective. Conclusions must be logical, clear, and substantiated by facts leading to proper recommendations. This will assure that contracts are only awarded to qualified contractors.

9.2. REQUEST CYCLE.

The contracting office submits a SF 1403, Preaward Survey of Prospective Contractor–General, to the Contract Administration Office (CAO). CAO who assigns a preaward survey monitor and manages the preaward survey program is responsible for planning and conducting the survey, and reporting the survey findings.

9.2.1. QA personnel will complete a SF 1406 whenever Quality Assurance Capability, block 19C of the SF 1403, is selected by the contracting office under the major factors to be investigated.

9.2.2. QA personnel will complete an SF 1406 whenever a SF 1403 is submitted. This will be done even if Quality Assurance Capability, block 19C, was not selected for investigation by the contracting office on the SF 1403. In this situation, the survey narrative should state that the report was initiated as part of DLA's policy to keep the contracting office constantly updated and aware of the prospective contractor's quality capabilities.

9.2.3. Secondary Surveys. Occasionally a major or important portion of the proposed contract will be performed at other company divisions or subcontractor plants located in other CAO element areas. If a QA secondary preaward survey is deemed necessary by QA personnel, a request for a secondary survey, indicating the extent of coverage desired, shall be forwarded to the preaward survey monitor. The monitor will arrange for the QA secondary preaward survey. Occasionally, requests for secondary surveys will be sent directly from the PO to the subcontractor's CAO due to the urgency of the request. Findings and conclusions will be recorded on the SF 1406 concerning the subcontractor's quality capabilities in performing that portion of the proposed contract which would be assigned. The principal QA participant will consider the secondary survey comments in reaching an award or no award recommendation. The conclusions of the secondary survey should be summarized in the primary report and the secondary survey attached.

9.3. TYPES OF SURVEYS

A preaward survey will normally be conducted on site. An onsite survey is conducted at the prospective contractor's facility to interview representatives of the prospective contractor, to review and evaluate procedures, plans, programs, records, etc., and to tour the facility to verify the existence of inspection and test equipment. A desk survey is conducted using information on file which will support a recommendation. The decisions to conduct a desk survey will be based on a determination that the information on file is current, valid, and sufficient. Resource impact will not be used as a justification to conduct a desk survey. The decision to conduct a desk survey will be coordinated with the preaward survey monitor and reviewed and approved by the head or deputy head of the activity.

9.4. PARTICIPANTS

Participants must have adequate technical knowledge of the commodity involved to enable them to determine whether the prospective contractor can comply with all quality requirements of the solicitation.

9.4.1. The QAR or the QAR's first line supervisor will participate in all surveys.

9.4.2. A technical specialist is required to perform surveys when one or more of the following situations exist:

9.4.2.1. There is a major procurement for complex items going into production for the first time or the solicitation covers critical or sensitive items.

9.4.2.2. The company has consistently failed to comply with QAR request to correct quality system/program deficiencies on recent or current contracts.

9.4.2.3. The company has failed to implement its proposals, commitments, or agreements from previous surveys to comply with contract quality requirements such as MIL–I–45208, Inspection System Requirements; MIL–Q–9858, Quality Program Requirements; and MIL–STD–45662, Calibration System Requirements; or to establish quality procedures.

9.4.2.4. There is a persistent pattern of the Government (in its own best interest) providing the company additional assistance (e.g., engineering and testing) which is above and beyond the requirements of the contract.

9.4.2.5. Commodity procedures, manuals, or regulations require the technical specialist's participation.

9.4.2.6. The contracting office has requested special areas of investigation.

9.4.3. The CAO QA Directorate will furnish qualified personnel when none are available at subordinate elements. The services of trained and qualified personnel from other sources, such as other CAOs or the contracting office, will be requested if the required talent is not available.

9.4.4. Participants in DFSC CONUS Preaward Surveys. Managers at subordinate activities (DFRs) shall act as the QA preaward surveys coordinators who will monitor the QA actions, and either select or assist in the selection of the principal QA participant in accordance with procedures to be established by the QA managers. The QA preaward survey coordinator shall take appropriate action to assure timely and effective accomplishment of surveys; act as liaison for all matters between QA participants and the preaward survey monitor, receiving and transmitting requests for QA surveys, information, clarifications, time extensions, and support surveys-;review the QA survey reports. The QA survey coordinator shall maintain a record of appropriate data required by the CAO and, as a minimum, will include numbers of QA onsite surveys, participations by PO technical personnel, QA invitations to the PO, times PO honored these invitations, negative recommendations, and overridden negative recommendations.

9.5. PLANNING

9.5.1. Prospective contractors will be given advance notice, to the extent practicable, of the QA agenda to be discussed during the survey. This will provide an opportunity for advance preparation.Plans shall ensure adequate programming of interviews with appropriate company personnel, plant tours, review, and evaluation of the prospective contractor's inspection system/quality program.The plans will be coordinated with the team leader.

9.5.2. On initial contact, if the prospective contractor reveals that the entire production and shipment will be performed at a location

other than that specified in the bid or request for survey, the preaward survey monitor should be notified. The monitor should contact the contracting office to verify the request and, if appropriate, request cancellation or transfer of the QA portion of the survey or a secondary survey if a major or important portion of the production will be performed elsewhere.

9.5.3. QA participants shall schedule their activities so as to assure timely completion of the survey. If additional time is required, the preaward survey monitor should be requested to obtain an extension as soon as the need is known.

9.5.4. Survey participants shall become familiar with the technical and QA requirements or the solicitation. Examples include product and quality specifications; other specified quality control and reliability requirements; Federal, state, and local regulations and housekeeping requirements which may affect end item quality;requirements for use of specific test equipment. Insufficiently detailed, inconsistent, or incorrect technical data packages shall be referred to the preaward survey monitor for clarification by the contracting office. A DD Form 1716, Contract Data Package Recommendation/Deficiency Report, and/or DD Form 1426, Standardization Document Improvement Proposal, will be prepared and included as an enclosure to the SF 1406. This is in addition to normal distribution of the DD Form 1426.

9.5.5. Special attention must be given to QA areas of particular interest to the contracting office, e.g., requests for submission of technical data, preaward samples, special services pertaining to the solicitation, requirement for first articles or qualification approvals, test equipment specifically designated in the solicitation, and product furnished by the contracting office with the survey.

9.5.6. QA participants shall arrive at uniform interpretations of requirements and evaluations prior to holding discussions with the prospective contractor's personnel. This also applies to other discussions before, during, and after the onsite survey.

9.6. SF 1406, PREAWARD SURVEY OF PROSPECTIVE CONTRACTOR QUALITY ASSURANCE

This form will be used to submit survey findings, conclusions, and recommendations to the contracting office. All surveys must provide detailed descriptions with examples and illustrations substantiating the recommendation. This will enable the contracting office to make a determination of the prospective contractor's responsibility.

9.6.1. Preparation of the SF 1406. The following guidance is to aid in preparing the SF 1406. Each report will vary with the solicitation, the prospective contractor, and the product or service involved.
Section I – General 9.6.1.1.1. Block 1 – Prospective Contractor. Self–explanatory.
Section II – Company and Solicitation Data. 9.6.1.2.1. Block 1 – Quality Assurance Organization. Include a brief description of its relationship to top management.

9.6.1.2.2. Block 2 – Quality Assurance Officials Contacted. Self–explanatory. If more than one title is held, list the additional titles.

9.6.1.2.3. Block 3 – Quality Reliability, Maintainability Requirements Which Apply. Self–explanatory.

9.6.1.2.4. Block 4 – Identical or Similar Items Have Been Produced/Serviced By Prospective Contractor. If only identical items are involved, delete 'or similar'and list previous contract numbers. If only similar items are involved, delete 'identical or' and briefly describe the similar items, i.e., nomenclature, national stock number, and contract number. Check the produced and serviced blocks as appropriate.

9.6.1.3. Section III – Evaluation Checklist. All statements will be checked yes, no, or not applicable (N/A). Some statements overlap or parallel with other statements, and some considerations, such as history, can be applied to all statements. A narrative of findings will be provided for each applicable statement. These findings will be the basis for the award or no award recommendation. The narrative will enable the contracting office to understand the rationale for the recommendation.

9.6.1.3.1. Block 1 – As Pertains to the Contract, These Items Are Understood By The Contractor. This is a multiple part statement concerned with determining if the prospective contractor thoroughly understands each of these elements as they relate to the solicitation. The prospective contractor's statement that these elements are understood is not a sufficient evaluation. These elements must be thoroughly discussed and reviewed as they relate to the specific solicitation to determine the prospective contractor's understanding.

9.6.1.3.2. Block 1a – Exhibits. The exhibit will usually be a DD Form 1423, Contract Data Requirements List, or a list of contract line items/subline items on bond paper, e.g., spare parts lists. In either case, it will be identified as an exhibit. Line item numbering is not a simple system; therefore, as the evaluator, you must assure yourself that the prospective contractor understands the requirement for exhibits.

9.6.1.3.3. Block 1a – Technical Data. Examples of technical data are operating instructions, maintenance manuals, overhaul instructions, spare parts catalogs, and drawings when identified as a line item in the solicitation. As an example, if there is a line item in the solicitation requiring sets of drawings and if the prospective contractor has reviewed and planned for it, the prospective contractor should be able to relate to you some of the specific requirements relative to producing the item and controlling the quality. Showing knowledge of required involved specifications or additional personnel and equipment needs may be an indication that the prospective contractor understands the requirement.

9.6.1.3.4. Block 1a – Drawings. The drawings referred to here are those contained in the data package of the solicitation. The drawings should be reviewed indepth with the prospective contractor; when large numbers are involved, a selected sample should be sufficient. This review and the ensuing discussion should be sufficient to determine if the prospective contractor understands them.

9.6.1.3.5. Block 1a – Specifications. The word 'specifications' is used in its general definition; therefore, this block includes all specifications, quality control and technical, that are indicated for use in this solicitation. Specifications should be thoroughly reviewed and discussed with the prospective contractor; however, it may not be practical to review all technical specifications because of the volume involved. In this event, a sample should be sufficient to make this determination for technical specifications. Regardless of which QA specifications are implemented, the objective is to determine if the prospective contractor understands them.Participants without authority to contractually bind the Government must not modify or interpret the specification in such a way that the Government is charged with having made a constructive change in the contract requirements. In some instances, reviewing the prospective contractor's history may indicate that it has had Government contracts with the particular specifications involved, in which case it probably understands them and will require only a cursory review to make a proper determination. Conversely, this may be the prospective contractor's first contract with the specifications involved. In this case, it may be necessary to review all of the requirements of the specifications to make the proper determination.

9.6.1.3.6. Block 1a – Approval Requirements. This element is concerned with any contractual requirement which must be approved before further action is taken by the prospective contractor. Generally, approval must come from the procuring activity. Examples of these are: design drawings, special gages, engineering changes, first articles, and preproduction samples. Determine if the prospective contractor is aware of these requirements, knows the procedures for obtaining approval, and is aware if there is a time limit involved, such as in a first article requirement.

9.6.1.3.7. Block 1b – Preservation, Packaging, Packing, and Marking Requirements. Discussions will concentrate on the quality assurance provisions of the requirements applicable to the solicitation.Requirements will be discussed to determine if the prospective contractor understands its responsibilities for inspections and tests. The survey should be coordinated with the packaging specialist when block 20C, Packaging, is selected for investigation on the SF 1403.

9.6.1.3.8. Block 1c – Other (Specify). Self–explanatory.

9.6.1.3.9. Block 2 – Records Available Indicate that Prospective

Contractor has a Satisfactory Quality Performance Record During the Past Twelve Months for Similar Items. Some functional records that should be used are unsatisfactory material reports and the Government's inspection records on previous Government contracts. If the prospective contractor has not had Government contracts, or has not had them in recent years, you could determine how well the prospective contractor is doing on commercial contracts. The number and method of processing customer returns should provide an indication of quality. Also, review the prospective contractor's production records to determine quality trends. When evaluating the prospective contractor who has previously done only commercial business, an approach an evaluator can take is to tell the prospective contractor to 'show me that you are good.' This will put the responsibility for providing objective evidence on the prospective contractor.

9.6.1.3.10. Block 3 – Used or Reconditioned Material and Former Government Surplus Material Will be Furnished by the Prospective Contractor. In many solicitations, the use of this type of material is specifically prohibited. In others, it may be permitted, or the solicitation may be silent on this point which will permit a bid which considers the use of used, reconditioned, or surplus material-.Review the solicitation thoroughly and positively determine if the use of this material is or is not permitted. If the prospective contractor proposes its use and indicates this in the bid proposal, request the preaward survey monitor obtain clarification from the contracting office. If the use of this type of material is permitted by the solicitation, there should be some method or procedure to be used that would assure the prospective contractor that this material'is in fact' serviceable and identical to that required. If the procurement is for surplus material, only block 20G, Other, on the *SF* 1403, should be checked. If additional factors are checked on the *SF* 1403, the preaward survey monitor should be requested to verify the requirement with the contracting office.

9.6.1.3.11. Block 4 – Prospective Contractor will Require Unusual Assistance from the Government. This includes Government assistance for engineering, inspection, testing, etc., which is provided in the Government's interest beyond normal contractual requirements.

9.6.1.3.12. Block 5 – Did Prospective Contractor Fulfill Commitments to Correct Deficiencies, as Proposed on Previous Surveys, When Awarded that Contract? Previous surveys should be reviewed to determine if the prospective contractor kept commitments such as obtaining additional equipment or personnel, training personnel, or correcting system deficiencies. Failure to keep previous commitments is justification for a no award recommendation.

9.6.1.3.13. Block 6 – Quality Control, Inspection, and Test Personnel. Self–explanatory. Comment if additional personnel will be hired and evaluate the prospective contractor's plan.

9.6.1.3.14. Block 7 – Inspection to Production Personnel Ratio. This ratio is the relationship of the total number of skilled and semiskilled quality personnel in block 6 to the total number of skilled and semiskilled production employees. The ratio will be reported in the form 1 :X where X is obtained by dividing the total production employees by the total quality personnel. The number of production employees should be coordinated with the industrial specialist preparing the SF 1405, Preaward Survey of Prospective Contractor Production. The narrative should address whether this ratio is considered adequate. Also, if the prospective contractor plans to use additional personnel or only a portion of those personnel which would result in ratio changes, this should be addressed in the narrative.

9.6.1.3.15. Block 8 – Inspection and Test Equipment, Gauges, and Instruments for First Article and Production(Including Solicitation Specified Equipment). Determine the existence, availability, and adequacy of test and inspection equipment. The prospective contractor's plans to obtain additional equipment required by the contract will be verified and evaluated. Acceptable evidence of the prospective contractor's ability to obtain additional resources, such as equipment, normally consists of a commitment or explicit arrangement that will be binding and enforceable at the time of contract award or earlier to rent, purchase, etc., the needed equipment, facilities, etc. Attach a copy of the commitment or agreement to the survey report.

9.6.1.3.16. Block 9 – Calibration/Metrology Program. Evaluate the ability of the prospective contractor's program to meet contractual requirements such as MIL–STD–45662. If MIL–STD–45662 is a requirement, Handbook 52, Evaluation of Contractor's Calibration System, may be used to evaluate the prospective contractor's program.

9.6.1.3.17. Block 10 – Written Procedures and Instructions for Inspections, Tests, Process Controls, and Other Requirements; Conformance Thereto; in Conjunction with Other Planning Control Functions. A negative award recommendation will be made for solicitations which include a requirement from MIL–I–45208, MIL–Q–9858, or other inspection system/quality program, and the prospective contractor has such a requirement in an existing contract but does not have an acceptable system/program. If the prospective contractor does not have an existing contract with the system/program requirement or is bidding to be a first–time Government contractor and consequently may not have an acceptable system/ program at the time of the preaward survey, a positive award recommendation will be given when there is documented planning in sufficient detail to indicate the contractor has a clear understanding of how the system/program requirements will be fulfilled, and gives high confidence that an acceptable system/program will be in place prior to production. Under similar conditions, a negative award recommendation will be given if there is not documented planning in sufficient detail to indicate the contractor has a clear understanding of how the system/program requirements will be fulfilled, and does not give high confidence that an acceptable system/ program will be in place prior to production. The planning should address such things as special processes; special tooling; inspection/testing equipment; numbers of personnel by skills, qualifications, certifications, etc.; as applicable to particular solicitation. In addition, in order to be given a positive award recommendation, the prospective contractor must have the necessary inspection/test equipment or a firm commitment to obtain the equipment by production start. When negative or positive award recommendations are made, the reasons must be fully documented on SF 1406 , Preaward Survey of Prospective Contractor Quality Assurance, under section IV.

9.6.1.3.18. Block 11 – Control of Specifications, Drawing, Changes and Modifications, Work/Process Instructions. Evaluate the adequacy of the prospective contractor's control over these items. Does the prospective contractor's system assure current data are distributed and obsolete data are recalled?Documents that can be checked for assurance of completeness and currency maybe found in engineering, production control, testing, assembly, and purchasing. Such factors as documentation, timeliness, approval, etc., should be considered.

9.6.1.3.19. Block 12 – Quality Assurance/Control Organizational Structure. Review the mission and function of the quality organization. Determine to what extent the quality organization can operate with cooperation and without interference from the other departments.

9.6.1.3.20. Block 13 – System for Determining Inspection, Test, and Measurement Requirements. Evaluate the system used by the prospective contractor to review all applicable specifications and determine what product characteristics and what test characteristics will be measured to determine conformance, and at what point in production these checks and tests will be performed. Plans, such as location of inspection stations, in–process inspections, and obtaining welding certifications, may also be evaluated.

9.6.1.3.21. Block 14 – Controls for Selecting Qualified Suppliers and Assuring the Quality of Purchased Materials. Evaluate the system to select and control vendors and subcontractors. This may include the prospective contractor's method to review supplier performance (vendor rating program), onsite inspection and audit of suppliers, etc., and procedures to identify and verify that suppliers/ materials directed by the solicitation are purchased and used. Incorporate information from secondary surveys requested on suppliers.

9.6.1.3.22. Block 15 – Material Control;Identification, Segregation, Maintenance, Preservation, and Correction of Defects. Evaluate procedures affecting control of material such as incoming inspection, holding areas, corrective action, routing tickets, rework/ scrap and reinspection, etc.

9.6.1.3.23. Block 16 – Government–Furnished Property Controls. Evaluate the prospective contractor's procedures for examination upon receipt for damage in transit, verification of quantities, periodic inspection/ maintenance of items in storage, etc. This should be coordinated with the property specialist when block 20A is selected for investigation on the SF 1403.

9.6.1.3.24. Block 17 – In–Process inspection Controls. This is a significant area of consideration because of the direct contribution to ultimate quality of end items, and is related to the evaluation of blocks 10, 11, 13, and 15. Some of the items to be covered include: control of tools and gauges, special processes, nonconforming material, and adequacy of inspection procedures.

9.6.1.3.25. Block 18 – System for Timely Identification and Correction of Deficiencies to Prevent Recurrence. Determine if the prospective contractor's plan assures first piece/part inspection and provides for periodic inspection.Evaluate the effectiveness of the action effort to identify the root cause of the deficiency and action to prevent recurrence.

9.6.1.3.26. Block 19 – Preservation, Packaging, Packing, Marking Controls. etermine the adequacy of procedures which control these items. For example, how will the prospective contractor verify the placement of bar code labels or the correct interpretation of the packaging code requirements.

9.6.1.3.27. Block 20 – Quality Control Records (Such as Inspection, Test, Corrective Actions, Calibration, etc.). Determine the adequacy of records as to accuracy, detail, and traceability. Determine that records are maintained on all inspections or tests performed. Determine that nonconformances are recorded and traceable to the product/ process, and that the calibration of test equipment/ fixtures is documented through an acceptable recall system. These records should be maintained in a current status and reviewed periodically. Inspection and testing records should, as a minimum, indicate the nature of the observations together with the number of observations made and the number and type of deficiencies found.

9.6.1.3.28. Block 21 – Controls for Investigation of Customer Complaints and Correction of Deficiencies. Determine the effectiveness of the prospective contractor's investigation, including control of exhibits and corrective action.

9.6.1.3.29. Block 22 – Reliability and/or maintainability Program. Review the solicitation for reliability/maintainability requirements such as MIL–STD–470, Maintainability Program Requirements (for Systems and Equipment); MIL–STD–785, Reliability Program for Systems and Equipment Development and Production; and MIL–STD–781, Reliability Tests: Exponential Distribution. Determine the adequacy of the test design, equipment, control of environmental conditions, etc. Also review previous tests of a similar nature.

9.6.1.4. Section IV – Quality Assurance Recommendations

9.6.1.4.1. Block 1 – Recommend Award/No Award(Provide Full Substantiation for Recommendation. Check the appropriate box. Th e QA recommendation must be an unqualified award or no award. The recommendation will be justified based on survey findings and provide a logical conclusion to the contracting office. A no award recommendation would be appropriate under such situations as:

9.6.1.4.2. Inadequacy of equipment or personnel to assure compliance with the specified quality requirements, and unwillingness or inability of obtaining the required additional equipment or personnel in time for start of production.

9.6.1.4.3. Consistently poor quality history.

9.6.1.4.4. Persistent failure to correct quality system/program deficiencies reported by the QAR/QSR on recent or current contracts.

9.6.1.4.5. Deficiencies exist and on previous contracts the prospective contractor failed to correct deficiencies which it had proposed to correct during a previous survey.

9.6.1.4.6. There is a persistent pattern of need for costly Government assistance (such as engineering, inspection, or testing) to the prospective contractor, provided in the Government's interest beyond normal contractual requirements, and caused by the prospective contractor's poor quality performance.

9.6.1.4.7. There is a quality system requirement and the prospective contractor does not have an acceptable system/program in place and ready for production.

9.6.1.4.8. Block 2 Survey Made By. Self–explanatory.

9.6.1.4.9. Block 3 – Telephone Number. Self–explanatory.

9.6.1.4.10. Block 4 – Date Submitted. Self–explanatory.

9.6.1.4.11. Block 5 – Reviewing/Approving Official. This will be Chief of the Operations Support Branch or Chief of the QA Division.

9.6.1.4.12. Block 6 – Date Approved. Self–explanatory.

9.6.1.4.13. Block 7 – Next Higher Authority. Use is optional.

9.6.1.5. Additional Information. Information concerning the following will be attached to the survey report:

9.6.1.5.1. Add the statement, "If prospective contractor receives award, a postaward conference is recommended." Then indicate yes or no. This will highlight the need to follow up on an award when a contractor may not have a clear understanding of the contract, technical requirements, or rights and obligations.

9.6.2. Distribution. A copy of the SF 1406 will be forwarded to the assigned QAR/QSR after signature in block 5 or 7. A copy will not be provided to the prospective contractor.

9.7. DEFICIENCIES

Deficiencies detected during the course of the onsite survey may be discussed with the prospective contractor since an exit interview is not required at the conclusion of a survey. The objective of the discussion is to verify information about the prospective contractor, and to provide the prospective contractor a further opportunity to demonstrate affirmatively its ability to conform to the requirements of the potential contract.

9.8. COMMITMENTS

During the survey, the prospective contractor may make proposals, commitments, or agreements to obtain that equipment, personnel, etc. Evidence of these shall be attached to the report, and a postaward conference recommended pending award of the contract.

9.9. DISCLOSURE OF SURVEY RESULTS

Survey participants will not furnish the prospective contractor or contracting office preliminary judgments about the survey recommendation.

Section 10
SERVICE CONTRACTS FOR TESTING SAMPLES

10.1. GENERAL

10.1.1. The use of these contracts must be monitored by the activity assigned inspection responsibility to assure that work performed is within the scope of the contract both as to nature and amount. Monitoring activities will also assure that the contract is used only for the purpose for which it was intended. These contracts will not normally be used for research–type analysis or for testing samples representing emergency situations, such as aircraft accidents, equipment failures, etc. Samples may be tested for department activities provided proper arrangements are made with and approval given by the monitoring activity.

10.1.2. The monitoring activity will also assure that:

10.1.2.1. The sample submitting activities are advised of the address to which samples are to be dispatched.

10.1.2.2. The QAR/QSR at the designated laboratory is advised that the sample is being forwarded and that the test is authorized. Other pertinent details such as method and time of shipment should be conveyed.

10.1.2.3. The cognizant Government quality office at source of the shipment is informed of any indicated deficiencies.

10.2. PROCESSING OF SAMPLES

10.2.1. In connection with the service testing of samples, the QAR/QSR at the designated laboratory will take the following action:

10.2.1.1. Arrange for accomplishment of test under his surveillance.

10.2.1.2. Advise the authorizing activity of results of test, and forward copies of test reports to that activity.

10.2.2. The authorizing office will take action to advise the submitting activity whether or not the material is approved for use.In the event doubt exists as to usability, or the material represented is definitely not satisfactory for use, the matter, with sufficient details, will be referred to the appropriate service technical activity or DFSC.

10.3. PREPARATION, CERTIFICATION, AND DISTRIBUTION OF CONTRACTORS' INVOICES

Invoices prepared by the contractor will indicate tests performed, date performed, and unit and total prices. The QAR/QSR cognizant of the testing performed will review the invoice to assure its accuracy and compliance with the contract. If in order, the QAR/QSR will apply date, and sign the following certification: 'I certify the services listed hereon have been accomplished in accordance with the provisions of the contract.' Certified invoices will be distributed in accordance with the contract and any supplemental departmental instructions.

Section 11
QUALIFIED PRODUCTS

11.1. GENERAL

The possible variations in quality and the nature of the tests for certain petroleum products are such that in order for the Government to obtain products of requisite quality, qualification testing is required prior to contract award. The entire process by which products are solicited from manufacturers, examined, and tested is defined as 'qualification.' If qualification is considered necessary, one or more of the following criteria shall apply: The time required to conduct one or more of the examinations and tests to determine compliance with all the technical requirements of the specification will exceed 30 days (720 hours). Use of this justification should advance product acceptance by at least 30 days(720 hours); quality performance inspection would require special equipment not commonly available; and it covers life survival or emergency life saving equipment. Those products requiring qualification, and the manner and extent of testing are set forth in the applicable product specification. A qualified product furnished to the Government under contract shall be manufactured from like materials obtained from the same source and processed in the same manner as the product submitted for qualification approval.

11.2. QUALIFIED PRODUCTS LIST

11.2.1. Products that pass all qualification tests and meet the approval of the qualifying agency are listed in the QPL. The QPL lists products qualified under the requirements stated in the applicable specification, and includes appropriate identification and reference data with the name and the plant address of the manufacturer (the actual producer) of the product. These lists are identified by the symbol "QPL" followed by the number of the associate specification and a number to identify the issue of QPL.For example, QPL–9000–25 identifies the 25th issue of the list associated with Military Specification MIL–L–9000. Copies of QPLs, revisions, or amendments are furnished to the Military Departments, DFSC, and DGSC by the DoD single stock point, the Naval Publications and Forms Center, Philadelphia, PA 19120. Inspection activities should obtain copies of the necessary QPLs through their own channels.

11.2.2. The fact that a product has been tested and placed on a QPL signifies only that at the time of examination and test the manufacturer could make a product which met specification requirements, and has agreed to produce the product (if awarded a contract) in the identical manner and using the same materials as the product that received qualification approval. Inclusion of a product on a QPL does not waive the requirements of specification or contract regarding inspection, testing, or acceptance, nor does it in any way release the manufacturer of his contractual obligation to deliver items meeting all specification requirements.

11.2.3. A qualified supplier may request extension of his qualification to another company or companies on a reblended basis.In such cases, the qualifying activity, after determining that the production facilities of the candidate company are acceptable, will designate a new qualification approval number of the reblender. A company with a reblend approval, blends the base stocks and additives at its own facility in accordance with the formulation of the original qualifier, and uses the reblend qualification number assigned to it for marking the containers.

11.2.4. A qualified supplier may also request extension of his approval to another company or companies on a rebrand basis. When a rebrand qualification is granted, the candidate company is given a new qualification number and is authorized to fill and package at its plant, the qualified product which was manufactured at the facility of the original qualifier. It uses the rebrand qualification number assigned to it in marking the containers.

11.2.5. The Federal Acquisition Regulation (FAR) permits the awarding of contracts for qualified products to suppliers who do not have original, reblend or rebrand qualification approval. An award may be made if the bidder specifies which qualified product he will furnish. In this case, a contractor must procure the finished product fully compounded from the qualified supplier and package it at his own facility. In marking containers he must insert the name and qualification number of the originally qualified company since he is not assigned a qualification number under these circumstances.

11.3. INSPECTION OF QUALIFIED PRODUCTS

11.3.1. Unless an extension of qualification is authorized by the qualifying activity, qualification of product applies only to the product that is manufactured at the plant which produced the sample qualified. In cases where extensions have been granted by the qualifying department to manufacturers to furnish a qualified product in plants other than the plant that produced the product qualified.

11.3.2. In addition to assuring that all inspection and acceptance tests of a qualified product offered under a contract meet the specification requirements, the QAR/QSR should also satisfy himself/herself that the production lot offered to the Government is the same product that received qualification approval. The QAR/QSR may verify a qualified product by comparing lot inspection test results with the test results obtained on the qualification sample.Giving consideration to normal test reproducibility and approved blending tolerances, abnormal variation between one or more test results of the qualification sample and the production sample may point up unauthorized deviations in manufacturing processes or unapproved substitution of materials. Such cases should be investigated. Investigation should include a review of the contractor's records and operations covering crude sources, type and amount of additives, manufacturing processes including percentages of blending components, and methods of blending or compounding. The test results of the sample receiving qualification approval together with process data of the qualified product may be obtained from the qualifying activity, or, at the QAR's option, from the manufacturer.

11.3.3. If such a review and investigation does not satisfy the QAR/QSR that a qualified product is being offered under the contract, acceptance of the lot in question should be withheld until the contracting officer is advised of all details through departmental channels and disposition instructions are received.

11.3.4. Further information on qualified products is contained in DLAM 8200.1, part 6.

Section 12
QUALITY ASSURANCE OF CRUDE OIL PURCHASED UNDER THE STRATEGIC PETROLEUM RESERVES (SPR PROGRAM)

12.1. GENERAL

12.1.1. The movement of crude oil by tanker, barge, or pipeline is a unique or specialized area of petroleum quality assurance. The changing nature of the crude oil itself presents problems that are difficult to resolve in accounting for quality and quantity. Certain crude oils have an affinity for holding unusual amounts of water in solution under certain conditions and releasing or dropping it when conditions change. The sediment content changes under certain handling conditions. When allowed to remain static in a tank, tanker, or barge for periods of time the sediment will drop out to the bottom of the vessel and accumulate in considerable quantities unless it is agitated by tank mixers on shore tanks or crude oil washing by tankers or barges when discharging cargos. Certain crudes contain hydrogen sulphide (H 2S), gas which is poisonous. Handling these crudes require the use of certain safety equipment by the QAR.Affected QARs are required to complete a period of training on handling H2S laden crude oil.

12.1.2. At certain FOB origin loading ports, the official contract quantity may be determined on the before and after gauges taken on the vessel being loaded. Provisions of the cognizant contract govern. It is therefore of utmost importance that accurate gauges be taken before and after loading and true representative samples be secured from the source shore tanks before loading and from the vessel after loading is completed. It is also important that vessels load to an even keel for an accurate load figure to be determined by the after loading ullages, even if subsequent transfers of cargo to trim to ship is required during the voyage. The vessel's log should reflect the transfer for review by the receiving Government QAR.

12.1.3. When automatic loading line samplers are used for obtaining the official sample for sediment and water determination, the QAR is responsible to determine that the automatic sampler is properly installed in a vertical line, or downstream of a static mixer in a horizontal line.

12.1.4. Destination acceptance shipments are normally made by the contractor, without the presence of a QAR. Official quantity and quality determinations are made at destination based on the vessel's composite sample taken before discharge or from automatic in–line samples taken during discharge, and the receiving shore tank gauges or meter quantities.

12.2. NOTIFICATION CONCERNING TANKER AND BARGE LIFTINGS AND DISCHARGES

12.2.1. The MSC furnishes advance information to the DoE on vessels chartered for origin acceptance loading. DoE then notifies the cognizant quality office on the load windows, vessel ETAs, contract item numbers, cargo numbers, and quantities to be lifted.

12.2.2. Information on destination acceptance loadings is secured by DoE from the supplier and forwarded to the receiving terminal and cognizant quality office.

12.3. PRELOADING INSPECTION OF ORIGIN ACCEPTANCE CRUDE OIL TANKERS AND BARGES

The QAR will assure that the following precautions have been taken prior to approving tankers or barges for loading.

12.3.1. Vessel conditioning has been performed in accordance with table II, 'Guide for Preparation of Cargo Tanks' when the last cargo was other than crude oil.

12.3.2. The QAR will verify that the vessel is suitable to load the intended cargo. This entail taking into account the nature and quantity of any ROB and a review of the vessel's previous loading documents. Regulations require the inerting of vessels during loading, discharging, or crude washing operations. This does not preclude the breaching of the inert system for gauging, sampling, and ROB determination, when loading/discharging operations are not actually in process.

12.3.3. Slops which are not part of the cargo should be segregated into one or more tanks, sealed off from the cargo and notations made on the cargo documents, listing the tank and seal numbers for the destination QAR. The quantity or location of slops should not prevent the vessel from loading the full ordered quantity, or cause any problems in loading or discharging the cargo.

12.3.4. Contractual waivers will be requested by the contractor for deviations in quality or on quantities in excess of the variation limit. Requests will be forwarded to the cognizant contracting officer or contracting officer's representative. The QAR will be advised, as expeditiously as possible, of the approval or rejection of any and all requests for waivers.

12.4. LOADING PROCEDURES FOR BARGES AND TANKERS

12.4.1. The quality of the crude oil loaded will be determined from samples taken from shore tanks, loading lines, or loaded vessels, as specified in the contract and verified by the QAR.

12.4.2. The QAR shall participate in the following cargo loading operations.

12.4.2.1. Sampling, testing, and approval of shore tank, line, or vessel samples.

12.4.2.2. Inspection and approval of the vessel for loading the intended cargo.

12.4.2.3. Witnessing gauges, water cuts, temperatures, and loading line preparation.

12.4.2.4. Observing the closing and sealing of sea suction and overboard discharge valves before loading, recording the seal numbers on the shipping documents and verifying their condition prior to release.

12.5. INSPECTION OF LOADED TANKERS AND BARGES

The QAR will be present during the final loading operations. Crude cargo contract provisions usually require loading within five percent, plus or minus, of the ordered quantity. Cargos loaded outside of this limitation must be approved by the contracting officer prior to acceptance. Cargo quantities are determined by shore tank gauges, in–line meters, or the loading vessel's ullages and tables, as specified in the contract. Composite samples will be taken from the loaded vessel and tested as required by the quality representative. A one–gallon composite sample from the loading shore tanks, the loading line, or the loaded vessel, in that order of preference, will be properly sealed, tagged, and placed aboard the vessel for delivery to the destination QAR.

12.6. INSPECTION OF VESSELS DISCHARGING CARGO

12.6.1. Prior to Discharge. FOB origin cargo vessels will be sampled, ullaged, and the free water and temperature determined. All level samples from each tank will be composited and tested for API and BS&W prior to discharge. If the results show the crude to be within specification for that crude group, discharge of the cargo may be started. The remaining required tests are to be accomplished as quickly as possible. On FOB destination cargos, vessels will be sampled, ullaged, and the free water and temperature determined. All specification tests will be accomplished prior to discharge. If any of these tests fail to meet the specifications, a waiver may be applied for by the contractor to the contracting officer or the contracting officer representative. The request should be made to the person(s) listed on DoE's current waiver instruction list.

12.6.2. Seals on sea suction and overboard discharge valves will be checked before discharge and the numbers recorded on the DLA Form 1606, Loading/ Discharge Record. Quantity calculations from the vessel ullages will be made and the totals compared with the after–loading vessel figures. Significant differences may dictate the need for rechecking the measurements before starting the discharge. The vessel's experience factor will be used, when available, to correct the quantity to net barrels at 60°F.

12.6.3. Upon completion of discharge, the vessel's tanks will be innaged to determine the quantity of cargo ROB. The ROB is listed separately as pumpable or unpumpable according to DoE instructions.The classification should be agreed on by all interested parties

as each of the vessel's tanks are innaged. Trim and list corrections, when applicable and available, are applied to pumpable product and water remaining in the vessel's tanks. The DLA Form 1606 is appropriately annotated and signed by the vessel's chief officer.The time statement is updated and signed by the chief officer. All delays and significant differences in the vessel's quantity as compared with the load quantity which cannot be resolved will be noted on the DD Form 250–1. Sea suction seals will be checked prior to release of the vessel.

12.6.4. Determination of net quantity received at destination will be determined by calibrated meters or receiving shore tank gauges-.Shore tanks will be allowed to settle the DoE required time before final gauges, samples, and temperatures.

12.6.5. Overages or shortages in excess of the DoE approved variation will be investigated and the origin QAR asked to conduct an investigation of the loading and reply so that a final resolution, or a determination, may be made by the receiving QAR.

12.7. FORMS AND REPORTS

12.7.1. It is the QAR's responsibility to assure that DLA Form 1606 for crude oil, or other appropriate form, and a DD Form 250–1 are properly prepared and distributed for each loading or discharge of crude oil. Preparation of the DLA Form 1606 is self–explanatory. The ullage report will be stapled to the corresponding DD Form 250–1 prior to distribution and mailing. The DD 250–1 should be annotated in block 28, Remarks, or the lower portion of block 26 to incorporate, by reference, the attached ullage report. A simple statement such as "vessel ullage report Form DLA 1606 attached" will provide the necessary cross reference. Distribution will be made in accordance with the 'latest SPR Distribution Table for DD Forms 250–1 and DLA Forms 1606 or other approved ullage forms.' The ullage report is exempted from the need for an RCS based on DLAR 5000.12, Management and Control of DLA Information Requirements, paragraph I.D.1.

12.7.2. The QAR may be requested, from time to time, to add additional pertinent information on the DD Form 250–1 documents to provide a more comprehensive accounting for intransit and other losses and gains.

12.7.3. The MSC tanker operation report will be submitted in accordance with provisions contained in paragraph 4.9 of this manual. The DD Form 250–1 message reports will be sent by the QAR as soon as the required loading or discharge information is complete and available.

12.8. LETTER OF PROTEST

12.8.1. A letter of protest should be issued by the QAR to the vessel's master for vessel delays or mishaps causing possible demurrage, loss of product, or other conditions which are unsafe;could result in loss of cargo, or incur possible vessel demurrage or excessive wharfage fees. If the master refuses to sign for acceptance of letter of protest, his name should be printed on the form in the signature block with the date and time. The notation"Refused to Sign" should be entered and, if possible, signed by a person who witnessed the master's refusal to sign. The original should be left on the vessel. The carbon copy should be referenced on and attached to the original DD Form 250–1 and retained with the QAR's files for access in case of dispute of litigation.

12.8.2. In case of an apparent loss of cargo at discharge port, the QAR conducts a bunker and void space survey. The bunker tanks and void spaces are gauged and sampled as seen fit by the QAR.

12.9. DRAWDOWN OF CRUDE FROM DOE STORAGE SITES

12.9.1. For drawdown of crude from DoE storage site, QAR indepth involvement is required to insure quality and quantity of crude oil.Guidance to the QAR for drawdown operations is provided in the specific procedures written for each drawdown, the SPR Accountability Manual SPR 6110.2, and contractor's written procedures for operation of DoE sites in addition to this manual.

12.9.2. Specific areas the QAR will be involved with include:

a. Gauging, sampling, and testing of tanks , ships, and barges.

b. Calculation of quantities (tanks and meters).

c. Meter proving.

d. Sampling (manual and automatic in–line samplers).

e. Documentation (DD Form 250, DD Form 250–1, Meter Calculation Sheets, Telecommunication Messages, and preparation of test sale documents).

f. Investigation where excessive losses occur. Explanation. In some drawdowns, oil may be pumped to terminals (example, Bryan Mound to Arco, May 87), pumped back to Bryan Mound. Other drawdown operations may involve actual sale of DoE oil companies.

g. Witnessing contractor procedures to insure separation of sweet and sour crude oil during movement.

12.9.3. The QAR is also involved with special procedures for periodic sampling oil stored in caverns.

12.9.4. In a drawdown, oil may be received at a terminal from pipelines, tanks, and caverns. Temperatures may vary in range of 30– 40°. This may require frequent proving of meters for determination of accurate quantities.

12.9.5. The field activity procedures for drawdown are essentially the same as for fill, except in reverse. All measurements, sampling, testing, and volume calculations and corrections incident to custody and title transfers shall be witnessed by a Government QAR.Purchasers will have the right to witness these functions.

12.10. QUALITY SURVEILLANCE AND QUANTITATIVE MEASUREMENTS

12.10.1. The Department of Energy/DOD Interagency Agreement provides that quality assurance services shall be furnished by DCAS for all petroleum received into the SPR, and for movements of SPR petroleum from receiving terminals to underground storage. DCAS QARs will be assigned to each SPR storage terminal where custody transfers take place. Specific guidelines for QARs are set forth in the following subparagraphs. CQA will be provided at loading terminals by DFSC or DCAS in accordance with DOD assigned areas of responsibility. QA requirements, responsibilities, and functions are further delineated in the SPR Quality Program and Test Criteria. A GOCO onsite terminal, such as at Bryan Mound, will operate under surveillance of the SPR. The site manager shall be responsible for accurate and timely documentation of all inventory transactions.Again, quality assurance services will be provided by DCAS QARs operating independently under the Department of Energy/ DoD Interagency Agreement.

12.10.2. Quality Surveillance. The basic guidelines for sampling and testing crude oil cargos shall be set forth in the American Society for Testing and Materials (ASTM) manual on the measurement and sampling of petroleum and petroleum products. The Government QAR will also be guided by existing DoD or DCAS regulation and contract terms and conditions, as applicable, for inspection sampling and testing of vessels and/or cargos of crude oil. The requirements set forth below are to be considered a minimum, and should not restrict additional sampling and/or testing should the QAR deem it advisable or necessary.

1210.2.1. Sampling

a. Arriving tanker cargos: an all–level sample from each compartment and composite sample for each tanker cargo.

b. Barge shipments: a composite sample from all barge compartments.

c. Pipeline shipments: a composite line or an all–level tank sample taken where the shipment enters the pipeline, and another at the receiving terminal or site from the main pipeline.

All samples shall be labeled for identification, including the number of cargo/pipeline tender or tanks from which obtained, and shall be retained for a minimum period of 90 days (archived samples will be stored indefinitely).

12.10.2.2. Testing. The testing requirements listed below shall be included in contracts for terminal services for the SPR program.

a. Arriving vessel cargos and pipeline tenders.

1. API Gravity

2. Total Sulfur (Wt. percent)

3. Pour Point (F)
4. Salt Content (Lbs/1000 Bbls)
5. Viscosity (SUS @ 60 F)
6. Reid Vapor pressure (Psia @ 100 F)
7. Water by Distillation (percent by volume)
8. Sediment by Extraction (weight percent)
b. Vessel and pipeline cargos shipped.
1. API Gravity
2. Water by Distillation
3. Sediment by Extraction
4. Total Sulfur (Wt. percent) ?subpara3

c. The applicable test results shall be entered in DD Form 250, block 16, and DD Form 250–1, block 26, as appropriate.

The terminal operator will perform all required tests in terminal facilities, if available, or arrange for such tests by a qualified agency. Testing will be witnessed, and results reviewed by the DCAS QAR before they are entered on the DD Form 250 series documents. In any case where the petroleum does not meet specifications, the QAR will contact the Program Management Office(PMO), Quality Assurance Division before allowing discharge of a vessel, or before further movement of pipeline receipts. Based on information supplied by the QAR, and on current SPR policy, a waiver will be issued for receipt of the petroleum, or instructions will be furnished for its disposition.

12.10.2.3. Determination of Quantity

1. Quantities will be determined from certified opening and closing shore tank gauge reports, except when certified meter readings or meter tickets are provided for by contractual arrangements (currently at Phillips Petroleum Co. dock, Freeport, Texas). All volumetric measurements will be converted to Gross Standard Volume (GSV) by first deducting free water (except where automatic line samples are used for determining the sediment and water (S&W), then using API Standard 2540, volume 1, tables 5A and 6A for conversion of gross at observed temperature to GSV; and to Net Standard Volume (NSV) by deducting S&W as determined by testing).

NOTE: Barging contracts, and terminal contracts for receipt and storage of SPR petroleum, normally provide for payment of throughput and transportation based on GSV. It will, therefore, be necessary to show the GSV on the related shipping/receiving documents in addition to the NSV.

2. Certified gauge reports, where applicable, will be prepared to reflect the change in inventory resulting from each receipt or delivery of a crude oil cargo. All quantities shall be stated as NSV barrels.

3. Where meters are used for measuring receipts and/or shipments, certified metering reports will be prepared to reflect the changes in inventory. If meters are equipped with ticket printing devices, the tickets will be summarized on a worksheet and attached thereto as supporting documents. Meter and temperature correction factors, pressure factor, and calculations of NSV will be shown on the worksheets.

4. When loading or discharging vessels, gauges of the vessels'compartments including a water cut, will be taken and recorded both before and after loading or discharging.?subpara3 The quantities thus determined will be compared with the shore tank gauging or metered quantities, before entry of the official quantity is made on the loading or discharge report.Any variation exceeding 4/10 of 1.0 percent (0.4 percent), (except where contractual provisions provide other percentage limits) will be investigated and resolved immediately, or explained in DD Form 250–1, block 28, as to the cause or probable cause of the variance.

5. Formats for gauging and metering reports: Contractors operating SPRO–owned terminals will use the forms prescribed herein.COCO terminals may use their own forms if they provide complete information as shown on the SPR PMO prescribed forms and worksheets;if not, the DoE–SPRO prescribed forms and worksheets will be required.

6. Disposition of gauging/metering reports: Completed gauging and/or metering reports and calculation worksheets will be attached as supporting documents to the related DD Form 250 for pipeline shipments and receipts, and the DD Form 250–1 for vessel loading or discharge reports. End–of–month tank gauge tickets, volumetric calculation worksheets, and S&W laboratory reports will be submitted in support of the physical inventory appearing on Monthly Inventory Reports. Other periodic gauging reports will be distributed as required.

7. A copy of the strapping (calibration) table for each shore tank used for storage of SPR petroleum at terminals and sites will be forwarded to the PMO, ATTN: Petroleum Accountability, PR–622.1, 900 Commerce Road East, New Orleans, LA 70123. When an additional tank is placed in service for SPR oil, the related table will be furnished immediately, or with the first month–end inventory report on which the new tank's inventory is reported.

12.11. INTRATERMINAL MOVEMENTS

12.11.1. Movements which alter the total tank inventory such as transfers from or to tanks for fill or evacuation of in–terminal pipelines will be witnessed by the DCAS QAR and documented on DD Form 250 supported by gauge tickets and appropriate volumetric calculation worksheets; and will be recorded in the terminal stock records. The completed DD Form 250 will be distributed as prescribed in appendix 2–1D.

Table I

LAST PRODUCT CARRIED/ PRODUCT TO BE LOADED	AVGAS MIL–G–5572.	MOGAS MIL–G–3056 VV–G–76.L/L, VV–G–1690.	JET FUEL MIL–T–5624, JP–4. MOGAS, U/L, VV–G–1690.	JET FUEL MIL–T–5624, JP–5.	PETROLEUM SOLVENT OR PAINT THINNER.	JET FUEL ASTM 165S JP–8/JETA	DIESEL FUEL MIL–F–16884 VV–F–800. NDF, MIL–F–24397.	BURNER FUEL OIL VV–F–815, GR. 1&2	BURNER FUEL OIL VV–F–815, GR. 4,5&6	LUBRICATING OILS.	JET FUEL MIL–T–25524, JPTS.MIL–T–38219, JP–7, (b)
NATURAL GASOLINE	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry
AVGAS MIL–G–5572	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry
MOGAS MIL–G–3056. VV–G–76. L/L, VV–G–1690	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry
JET FUEL MIL–T–5624, JP–4. MOGAS, U/L VV–G–1690	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Steam Dry
JET FUEL MIL–T–5624, JP–5.	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry
PETROLEUM SOLVENT OR PAINT THINNER.	Steam Dry	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Drain Empty	Drain Empty	Steam Dry	Steam Dry
JET FUEL ASTM 165S JP–8/JETA	Steam Dry	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry
DIESEL FUEL MIL–F–16884, VV–F–800. NDF, MIL–F–24397.	Steam Dry	Drain Empty	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry
BURNER FUEL OIL VV–F–815, GR. 1&2	Steam Dry	Drain Empty	Steam Dry	Steam Dry	Steam Dry	Steam Dry	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Steam Dry
BURNER FUEL OIL VV–F–815, GR. 4,5&6	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	Drain Empty	NO LOAD	NO LOAD
LUBRICATING OILS	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	NO LOAD	Drain Empty	Drain Empty	Drain Empty	Drain Empty (a)	NO LOAD
JET FUEL MIL–T–25524, JPTS. MIL–T–38219, JP–7	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Drain Empty	Steam Dry	Drain Empty

Table I
—Continued

LAST PRODUCT CARRIED/ PRODUCT TO BE LOADED	AVGAS MIL–G–5572.	MOGAS MIL–G–3056 VV–G–76.L/L, VV–G–1690.	JET FUEL MIL–T–5624, JP–4. MOGAS, U/L, VV–G–1690.	JET FUEL MIL–T–5624, JP–5.	PETROLEUM SOLVENT OR PAINT THINNER.	JET FUEL ASTM 165S JP–8/JETA	DIESEL FUEL MIL–F–16884 VV–F–800. NDF, MIL–F–24397.	BURNER FUEL OIL VV–F–815, GR. 1&2	BURNER FUEL OIL VV–F–815, GR. 4,5&6	LUBRICATING OILS.	JET FUEL MIL–T–25524, JPTS.MIL–T–38219, JP–7, (b)

Notes:
APPLICABLE ONLY WHEN LOADING COMPATIBLE OILS, OTHERWISE STEAM AND DRY.
TO BE LOADED ONLY IN ALUMINUM, STAINLESS STEEL EQUIPMENT OR EQUIPMENT LINED WITH AN APPROVED EPOXY COATING. IF EQUIPMENT IS COATED, CLEAN WITH HOT FRESH WATER NOT EX. CEEDING 136 F AND DAY THOROUGHLY.

GENERAL INSTRUCTIONS

1. EQUIPMENT CARRYING LUBRICATING OIL WILL BE DRY AND FREE FROM LOOSE RUST, SCALE AND DIRT. EQUIPMENT CARRYING OTHER PRODUCTS WILL BE SUBSTANTIALLY FREE FROM LOOSE RUST, SCALE AND DIRT.
2. SARAN LINED EQUIPMENT SHOULD NOT BE STEAM CLEANED; WATER WASH SHOULD SUFFICE.
3. PETROLEUM PRODUCTS WILL NOT BE LOADED INTO TRANSPORTATION EQUIPMENT WHOSE PREVIOUS CARGO WAS CAUSTIC, ACID OR CHLORINATED SOLVENTS.
4. TANK TRUCKS IN LIQUID FERTILIZER SERVICE SHALL NOT LOAD AVIATION TURBINE FUELS DIRECTLY, BUT SHALL CARRY OUT AT LEAST TWO LOADS OF COMMERCIAL GASOLINE PRIOR TO THE AVIATION TURBINE FUEL LOAD.
5. CONVERSION OF GOVERNMENT–OWNED TANK CARS FROM LIQUID FERTILIZER SERVICE TO AVIATION TURBINE FUEL SERVICE WILL ONLY BE DONE WHEN NO OTHER ALTERNATIVE EXISTS. TANK CARS BEING CONVERTED FROM LIQUID FERTILIZER SERVICE TO A PETROLEUM PRODUCT SHALL BE ADEQUATELY CLEANED TO REMOVE ALL TRACES OF LIQUID FERTILIZER. AT A MINIMUM THE EQUIPMENT MUST BE STEAM CLEAN; DRIED AND WILL BE FREE FROM LOOSE RUST, SCALE AND DIRT. AFTER CLEANING, EQUIPMENT WITH UNLINED COMPARTMENTS SHOULD HAVE ITS COMPARTMENTS LINED WITH AN APPROVED COATING AT THIS TIME. CONVEYANCES SHALL NOT BE RELEASED FROM ORIGIN LOADING POINT UNTIL LOADED CONVEYANCE IS SAMPLED AFTER A MINIMUM WAIT OF 24 HOURS AFTER LOADING. THE SAMPLE SHALL BE TESTED TO TYPE B–2 TESTS PLUS THERMAL STABILITY TEST (IF REQUIRED BY THE PRODUCT SPECIFICATION). AFTER TYPE B–2 TESTS INDICATE COMPLIANCE WITH SPECIFICATION REQUIREMENTS, THE CONVEYANCE CAN BE RELEASED PENDING RESULTS OF THERMAL STABILITY TEST. THE CONVEYANCE WILL NOT BE UNLOADED UNTIL ORIGIN QAR NOTIFIES THE DESTINATION THAT THE THERMAL STABILITY TEST (WHEN REQUIRED) HAS PASSED. WHEN THE ABOVE CONDITION APPLIES, THE DD–250, SHALL BE SO NOTED.

NOTES FOR TABLE I

(a) Applicable only when loading compatible oils, otherwise steam and dry.
(b) To be loaded only in aluminum, stainless steel equipment, or equipment lined with an approved epoxy coating. If equipment is coated, clean with hot fresh water not exceeding 135°F and dry thoroughly.
1. Equipment carrying lubricating oil will be dry and free from loose rust, scale and dirt. Equipment carrying other products will be substantially free from loose rust, scale, and dirt.
2. Saran–lined equipment should not be steam cleaned; water wash should suffice.
3. Petroleum products will not be loaded into transportation equipment that previously carried caustic, acid, or chlorinated solvents.
4. Tank trucks in liquid fertilizer service shall not load aviation turbine fuels directly, but shall carry out at least two loads of commercial gasoline prior to the aviation turbine fuel load.
5. Conversion of Government–owned tank cars from liquid fertilizer service to aviation turbine fuel service will only be done when no other alternative exists. Tank cars being converted from liquid fertilizer service to a petroleum product shall be adequately cleaned to remove all traces of liquid fertilizer.
6. 'No load' designations apply to equipment presented for loading directly after hauling an unsuitable product. Proper cleaning can make this equipment suitable for loading.

Table II
GUIDE FOR PREPARATION OF CARGO TANKS

LAST PRODUCT CARRIED/ PRODUCT TO BE LOADED	AV GAS MO GAS (5)	JP–4 JET B	JP–5 (7) JP–8 JET A/A–1	KEROSENE DF–A	F–76 DF–1/2 FS–1/2	FS–4/5/6 NSFO	JPTS JP–7	LUBE OILS	CRUDE OILS
AV GAS MO GAS (LEADED)	A	BF	BF	B	B	B	(3)	E	A [1]
MO GAS, U/L JP–4 JET–B	A	F	BF	B	B	B	(3)	E	A1
JP–5 JP–8 JET A/A–1 KEROSENE DFA	A	F	F	A	A	A	(3)	E	A1
F–76 DF–1/2 FS–1/2	C	CF	CF	C	A	A	(3)	E	A1
FS–4/5/6 NSFO	NO LOAD (1)	NO LOAD (1)	NO LOAD (1)	NO LOAD (1)	D	A	(3)	E	D
JPTS JP–7	A	F	F	A	A	A	(3)	E	A1
LUBE OILS (4)	D	DF	DF	D	D	A	(3)	E	A1
COMMERCIAL DIESEL FUEL	D	DF	DF	D	D	A	(3)	E	A1
MOLASSES TAR, WAX	NO LOAD	NO LOAD	NO LOAD	NO LOAD	D(1)	D	(3)	E(1)	E
CRUDE	NO LOAD	NO LOAD	NO LOAD	NO LOAD	D(1)	A	(3)	NO LOAD	A1
GRAIN	B	(2)	(2)	B	B	B	(3)	E1	B
ORE	NO LOAD	NO LOAD	NO LOAD	NO LOAD	B	B	(3)	E1	E
COAL	NO LOAD	NO LOAD	NO LOAD	NO LOAD	B	B	(3)	E1	E
HEAVY, HI–SULFUR CRUDE	NO LOAD	NO LOAD	NO LOAD	NO LOAD	D1	E1	(3)	NO LOAD	A1

NOTES FOR TABLE II

A. All cargo lines will be dropped, tanks stripped, ballast residue removed, and cargo tanks gas freed to permit entry and inspection.

A1 No specific preparations required if lines have been dropped and tanks stripped.

B. All cargo and vent lines will be drained of previous product and flushed with cold water. Cargo tanks will be thoroughly machined washed using cold water. Cargo tanks must be free of water, loose rust, sludge, mud, silt,etc.

C. The same as for B. except that hot water will be used instead of cold. If tank interiors are coated, water temperature should not exceed 135°F.

D. Cargo tanks and systems will be processed in accordance with the instructions contained in NAVSHIPS 0900–16–0010, Manual for Cargo Tank Cleaning.

E. Cargo tanks and systems must be cleaned in such a manner as will remove all rust, scale, sediment, and all traces of previous cargo and water.

F. After dropping lines, hand hose tank bottoms, and remove all puddles of water from bottom surfaces.

1. Vessels which have carried linseed oil, cottonseed oil, tar, wax molasses, or other products which would probably contaminate the cargo to be laded will be rejected unless cleaned in accordance with D. and have carried (after cleaning) at least two cargos of clean product.

2. Vessels will not go directly from grain to jet fuel service.

3. Special tank preparations and cargo handling is required for JP–7/JPTS to prevent contamination. Tanks used for lading must be coated with an approved epoxy. Coating must be adherent; No flaking, peeling, or blistering. It is mandatory that JP–7/JPTS be loaded in tanks in which the last product carried was JP–4, JP–5, kerosene, nonaromatic solvent, unleaded gasoline, or arctic diesel. Prior to loading JP–7/JPTS, tank cleaning requirements are: tanks must be machine washed with hot water. If cleaning chemical and/or salt water is used, the final wash must be with fresh water. Tank bottoms, interior bulkheads, and internals must be completely free of sediment, scale, and other contaminants.

Tanks must be dry and all liquids completely removed from the tanks.

Lines, after cleaning, must be flushed with fresh water, drained, and freed of all water. Loading and unloading system must be completely isolated. This will be accomplished by completely separate piping systems or by use of blinds. Valves will not be depended on to effect isolation. No common lines will be used, steam smothering lines should have at least two valves that can be sealed from the main line to the tanks, or a blind installed that can be readily removed. Each tank will have its own individual vent. If ship has a common vent system, tanks used for JP–7/JPTS must be isolated from balance of the vent system.

4. Vessels in which the previous cargo was lubrication oil must load and transport at least two clean cargos, after cleaning IAW the NAVSHIPS 0900–016–0010 manual prior to carrying aviation fuel.

Table II
GUIDE FOR PREPARATION OF CARGO TANKS—Continued

LAST PRODUCT CARRIED/ PRODUCT TO BE LOADED	AV GAS MO GAS (5)	JP–4 JET B	JP–5 (7) JP–8 JET A/ A–1	KEROSENE DF–A	F–76 DF–1/2 FS–1/2	FS–4/5/6 NSFO	JPTS JP–7	LUBE OILS	CRUDE OILS

5. Vessels with zinc–type coatings will not be used to carry U.S. Government– owned/ consigned leaded gasoline (aviation or motor). The cargo tank coating must comply with the requirements of class I (epoxy) or class 4 (urethane) of DoD–P–23236A (paint coating systems, steel ships tank). Class 2 (coal tar–epoxy), and class 3 (silicate, phosphate, or silicone zinc) are not acceptable.

6. Vessels whose cargo tanks are coated with class 2 (coal–tar epoxy) coatings of DoD–P–23236A are not acceptable to carry any U.S. Government owned/consigned petroleum products. Vessels whose cargo tanks are coated with class 1, class 2, or class 4 DoD–P–23236A are acceptable to carry all U.S. Government–owned/consigned turbine fuels, diesel fuels, and fuel oils.

7. All vessels' cargo tanks in which JP–5 turbine fuel is transported must be coated with either class 1, class 3, or class 4 type coatings as identified above. Cargo tanks must have at least 80 percent of coating intact.

NOTE: Machine washing of cargo tanks referenced in paragraphs B, C, and (3) above, will be accomplished in accordance with the procedures contained in NAVSHIPS 0900–016–0018, Manual for Cargo Tank Cleaning, paragraph 6.3.

Table III
SEGREGATION OF PRODUCT MOVEMENTS VIA MULTIPRODUCT PIPELINES HEAD PRODUCTS

GRADE 115/145 '145'	GRAD0E 100/130 '130'	PREMIUM GASO. 'PG'	REGULAR GASO. 'RG'	GRADE JP–4 'JP–4'	DIESEL 'D'	GRADE JP–5 'JP–5'	TAIL PRODUCT
	CUT FROM '130' TK TO 145' TK WHEN FIRST SAMPLE SHOWING 100% '145' ARRIVES AT CUTTING POINT.	CUT FROM 'PG' TK TO '145' TK WHEN FIRST SAMPLE SHOWING 100% '145' ARRIVES AT CUTTING POINT.	CUT FROM 'RG' TK TO '145' TK WHEN FIRST SAMPLE SHOWING 100% '145' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–4' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF '145' AT CUTTING POINT.CUT FROM TRANSMIX TK OR STREAM TO '145' TK WHEN FIRST SAMPLE SHOWING 100% '145' ARRIVES AT CUTTING POINT.	CUT FROM 'D' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF '145'. CUT FROM STREAM OR TRANSMIX TK TO '145' TK WHEN FIRST SAMPLE SHOWING 100% '145' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–5' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF '145'. CUT FROM STREAM OR TRANSMIX TK TO '145' TK WHEN FIRST SAMPLE SHOWING 100%'145' ARRIVES AT CUTTING POINT.	115/145 '145'
CUT FROM '145' TK TO '130' TK WHEN FIRST SAMPLE SHOWS INDICATION OF '130' AT CUTTING POINT.		CUT FROM 'PG' TK TO '130' TK WHEN FIRST SAMPLE SHOWING 100% '130' ARRIVES AT CUTTING POINT.	CUT FROM 'RG' TK TO '130' TK WHEN FIRST SAMPLE SHOWING 100% '130' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–4' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF '130' AT CUTTING POINT.CUT FROM TRANSMIX TK OR STREAM TO '130' TK WHEN FIRST SAMPLE SHOWING 100% '130' ARRIVES AT CUTTING POINT.	CUT FROM 'D' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF '130'. CUT FROM STREAM OR TRANSMIX TK TO '130' TK WHEN FIRST SAMPLE SHOWING 100% '130' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–5' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF '130'. CUT FROM STREAM OR TRANSMIX TK TO '130' TK WHEN FIRST SAMPLE SHOWING 100%'130' ARRIVES AT CUTTING POINT.	100/130 '130'
CUT FROM '145' TK TO 'PG' TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'PG' AT CUTTING POINT.	CUT FROM '130' TK TO 'PG' TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'PG' AT CUTTING POINT.		CUT FROM 'RG' TK TO 'PG' TK WHEN FIRST SAMPLE SHOWING 100% 'PG' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–4' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'PG' AT CUTTING POINT.CUT FROM TRANSMIX TK OR STREAM TO 'PG' TK WHEN FIRST SAMPLE SHOWING 100% 'PG' ARRIVES AT CUTTING POINT.	CUT FROM 'D' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'PG'. CUT FROM STREAM OR TRANSMIX TK TO 'PG' TK WHEN FIRST SAMPLE SHOWING 100% 'PG' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–5' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'PG'. CUT FROM STREAM OR TRANSMIX TK TO 'PG' TK WHEN FIRST SAMPLE SHOWING 100% 'PG'ARRIVES AT CUTTING POINT.	PREMIUM GASO. 'PG'
CUT FROM '145' TK TO 'RG' TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'RG' AT CUTTING POINT.	CUT FROM '130' TK TO 'RG' TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'RG' AT CUTTING POINT.	CUT FROM 'PG' TK TO 'RG' TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'RG' AT CUTTING POINT.		CUT FROM 'JP–4' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'RG' AT CUTTING POINT.CUT FROM TRANSMIX TK OR STREAM TO 'RG' TK WHEN FIRST SAMPLE SHOWING 100% 'RG' ARRIVES AT CUTTING POINT	CUT FROM 'D' TK TO STREAM OF TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'RG'. CUT FROM STREAM OR TRANSMIX TK TO 'RG' TK WHEN FIRST SAMPLE SHOWING 100% 'RG' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–5' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'RG'. CUT FROM STREAM OR TRANSMIX TK TO 'RG' TK WHEN FIRST SAMPLE SHOWING 100% 'RG'ARRIVES AT CUTTING POINT.	REGULAR GASO. 'RG'

Table III
SEGREGATION OF PRODUCT MOVEMENTS VIA MULTIPRODUCT PIPELINES HEAD PRODUCTS—Continued

GRADE 115/145 '145'	GRAD0E 100/130 '130'	PREMIUM GASO. 'PG'	REGULAR GASO. 'RG'	GRADE JP–4 'JP–4'	DIESEL 'D'	GRADE JP–5 'JP–5'	TAIL PRODUCT
CUT FROM '145' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–4' AT CUTTING POINT. CUT FROM TRANSMIX TK OR STREAM TO 'JP–4' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–4' ARRIVES AT CUTTING POINT.	CUT FROM '130' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–4' AT CUTTING POINT. CUT FROM TRANSMIX TK OR STREAM TO 'JP–4' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–4' ARRIVES AT CUTTING POINT.	CUT FROM 'PG' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–4' AT CUTTING POINT. CUT FROM TRANSMIX TK OR STREAM TO 'JP–4' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–4' ARRIVES AT CUTTING POINT.	CUT FROM 'RG' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–4' AT CUTTING POINT. CUT FROM TRANSMIX TK OR STREAM TO 'JP–4' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–4' ARRIVES AT CUTTING POINT.		CUT FROM 'D' TK TO TRANSMIX TK OR STREAM WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–4' AT CUTTING POINT. CUT FROM TRANSMIX TK OR STREAM TO 'JP–4' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–4' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–5' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–4'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–4' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–4' ARRIVES AT CUTTING POINT.	'JP–4'
CUT FROM '145' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'D'. CUT FROM STREAM OR TRANSMIX TK TO 'D' TK WHEN FIRST SAMPLE SHOWING 100% 'D'ARRIVES AT CUTTING POINT.	CUT FROM '130' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'D'. CUT FROM STREAM OR TRANSMIX TK TO 'D' TK WHEN FIRST SAMPLE SHOWING 100% 'D'ARRIVES AT CUTTING POINT.	CUT FROM 'PG' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'D'. CUT FROM STREAM OR TRANSMIX TK TO 'D' TK WHEN FIRST SAMPLE SHOWING 100% 'D' ARRIVES AT CUTTING POINT.	CUT FROM 'RG' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'D'. CUT FROM STREAM OR TRANSMIX TK TO 'D' TK WHEN FIRST SAMPLE SHOWING 100% 'D' ARRIVES AT CUTTING POINT.	CUT FROM 'JP–4' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'D'. CUT FROM STREAM OR TRANSMIX TK TO 'D' TK WHEN FIRST SAMPLE SHOWING 100% 'D'ARRIVES AT CUTTING POINT.		CUT FROM 'JP–5' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'D'. CUT FROM STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWING 100% 'D' ARRIVES AT CUTTING POINT.	DIESEL 'D'
CUT FROM '145' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–5'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–5' TK WHEN FIRST SAMPLE SHOWING 100%'JP–5' ARRIVES AT CUTTING POINT.	CUT FROM '130' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–5'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–5' TK WHEN FIRST SAMPLE SHOWING 100%'JP–5' ARRIVES AT CUTTING POINT.	CUT FROM 'PG' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–5'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–5' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–5'ARRIVES AT CUTTING POINT.	CUT FROM 'RG' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–5'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–5' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–5'ARRIVES AT CUTTING POINT.	CUT FROM 'JP–4' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–5'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–5' TK WHEN FIRST SAMPLE SHOWING 100%'JP–5' ARRIVES AT CUTTING POINT.	CUT FROM 'D' TK TO STREAM OR TRANSMIX TK WHEN FIRST SAMPLE SHOWS INDICATION OF 'JP–5'. CUT FROM STREAM OR TRANSMIX TK TO 'JP–5' TK WHEN FIRST SAMPLE SHOWING 100% 'JP–5'ARRIVES AT CUTTING POINT.		'JP–5'

Notes:

NOTE:
HEAD PRODUCT – PRODUCT BEING RECEIVED AT CUTTING POINT.
TAIL PRODUCT – PRODUCT DISPLACING MATERIAL ON STREAM AT CUTTING POINT.
PREMIUM GASOLINE – RECIPROCATING ENGINE FUEL WITH MOTOR METHOD KNOCK RATING OF 89 OCTANE OR ABOVE.
REGULAR GASOLINE – RECIPROCATING ENGINE FUEL WITH MOTOR METHOD KNOCK RATING OF 85 OCTANE OR LOWER.
THE CUT POINT BETWEEN PRODUCTS IS DETERMINED BY COLOR AND GRAVITY

Table IV
PRODUCT CHANGE RECORD

a. THE SUGGESTED PRODUCT CHANGE RECORD IS ACCOMPLISHED AS FOLLOWS:

(1) LOCATION: ENTER THE NAME OF TERMINAL OR LOCATION ON LINE WHERE DATA ARE BEING GENERATED.
(2) DATE: INDICATE DAY, MONTH, AND YEAR DATA WERE ACCUMULATED.

(3) FROM: INDICATE NAME, GRAVITIES AND FLASH (IF APPLICABLE) OF HEAD PRODUCT.

(4) TO: INDICATE NAME, GRAVITIES AND FLASH (IF APPLICABLE) OF MATERIAL DISPLACING HEAD PRODUCT.

(5) PUMPING RATE: INDICATE BARRELS PER HOUR AND BARRELS PER MINUTE.

(6) CHANGEARRIVED: INDICATE DISPATCHER'S ESTIMATED TIME OF PRODUCT ARRIVAL AND ACTUAL TIME OF FIRST GRAVITY BREAK.

(7) TIME: INDICATE THE HOUR AND MINUTE EACH LINE SAMPLE IS TAKEN. (SAMPLES SHOULD BE TAKEN EACH MINUTE THROUGHOUT THE INTERFACE.)

(8) API GRAVITY: ENTER THE API GRAVITY OF EACH LINE SAMPLE.

(9) TANK NUMBER: ENTER THE NUMBER OF TANK OR TANKS RECEIVING THE INTERFACE (IF APPLICABLE).

(10) FLASH: INDICATE FLASH POINT IN DEG REES FAHRENHEIT (IF APPLICABLE).

(11) BBLS MIX: INDICATE INCREMENT VOLUME RECEIVED FROM TIME OF ONE SAMPLE TO THE NEXT.

(12) AVG API GRAVITY: INDICATE AVERAGE API GRAVITY.

(13) AVG SPEC GRAVITY: INDICATE THE AVERAGE API GRAVITY CONVERTED TO SPECIFIC GRAVITY.

(14) PERCENT DISPLACING PRODUCT IN MIX:ENTER IN THIS COLNUM THE RESULTS FROM THE FOLLOWING FORMULA:

$$\text{AVG SPEC GRAVITY OF BBLS MIX} - \text{SPECIFIC GRAVITY OF HEAD PRODUCT} \times 100$$
$$\text{SPECIFIC GRAVITY OF DISPLACING PRODUCT} - \text{SPECIFIC GRAVITY OF HEAD PRODUCT}$$

(15) BBLS (DISPLACING PRODUCT) IN MIX:ENTER IN THIS COLNUM THE RESULTS OF THE FOLLOWING FORMULA: PERCENT DISPLACING PRODUCT IN BBLS MIX × BBLS MIX.

(16) BBLS(HEAO PRODUCT) IN MIX: ENTER IN THIS COLNUM THE RESULTS OF THE FOLLOWING FORMULA: BBLS MIX MINUS BBLS DISPLACING PRODUCT MIX.

(17) GRAVITY CHANGE: ENTER IN THIS COLNUM THE RESULTS OF THE FOLLOWING FORMULA: AVG SPEC GRAVITY OF BBLS MIX MINUS SPECIFIC GRAVITY OF HEAD PRODUCT.

b. THE PRODUCT CHANGE RECORD ILLUSTRATES TYPICAL ENTRIES. AN EXAMPLE OF A MINUTE INCREMENT CALCULATION IS AS FOLLOWS:

(1) EXAMPLE–A
(a) HEAD PRODUCT IS GASOLINE WITH GRAVITIES OF 66.1 API AND .7161 SPECIFIC.
(b) DISPLACING PRODUCT IS FUEL OIL WITH GRAVITIES OF 41.4 API AND .8184 SPECIFIC.
(c) FLOW RATE IS 2025 BARRELS PER HOUR OR 33.75 BARRELS PER MINUTE.

Table V
SAMPLE CALCULATIONS

LOCATION:	PRODUCT CHANGE RECORD DATE:										
	TIME	API GTY	TANK NR	FLASH	BBLS MIX	AVG API GTY	AVG SPEC GTY	% FO IN MIXT	BBLS FO IN MIXT	BBLS MG IN MIXT	GTY CHANGE
FROM	7:55	66.1									
PRODUCT: MOGAS	7:57	65.9			67.5	66.0	.7165	.39	.27	67.2	.0004
API GRAVITY: 66.1	7:58	65.8			33.8	65.9	.7168	.68	.23	33.6	.0007
SPEC GRAVITY: 7161	7:59	65.7			33.8	65.8	.7172	1.07	.36	33.4	.0011
FLASH: NA	8:00	65.2			33.8	65.5	.7183	2.15	.73	33.1	.0022
	8:01	64.7			33.8	65.0	.7201	3.91	1.3	32.5	.0040
	8:02	63.8			33.8	64.3	.7227	6.45	2.2	31.4	.0066
TO	8:04	61.7			67.5	62.8	.7283	11.93	8.1	59.4	.0122
PRODUCT: FUEL OIL	8:05	58.2			33.8	60.0	.7389	22.29	7.5	26.3	.0228
API GRAVITY: 41.4	8:06	54.1			33.8	56.2	.7539	36.95	12.5	21.3	.0378
SPEC GRAVITY: .8184	8:07	50.3			33.8	52.2	.7703	52.98	17.9	15.9	.0542
FLASH: NA	8:08	48.5			33.8	49.4	.7822	64.61	21.8	12.0	.0661
	8:09	45.9			33.8	47.2	.7918	74.0	25.0	8.8	.0757
	8:10	44.2			33.8	45.1	.8012	83.19	28.2	5.6	.0851
	8:11	43.4			33.8	43.8	.8072	89.05	30.1	3.7	.0911
	8:12	43.2			33.8	43.3	.8095	91.30	30.9	2.9	.0934
PUMPING RATE	8:13	42.3			33.8	42.8	.8118	93.55	31.6	2.2	.0957
BARRELS PER HOUR: 2025	8:14	42.2			33.8	42.3	.8142	95.89	32.4	1.4	.0981
BARRELS PER MINUTE: 33.75	8:15	42.0			33.8	42.1	.8151	96.77	32.7	1.1	.0990
	8:16	41.4			33.8	41.7	.8170	98.63	33.3	.5	.1009
	8:18	41.4			67.5						
CHANGE ARRIVED	8:20	41.4			67.5						
DISPATCHERS ESTIMATE 7:50 AM											
FIRST BREAK: 7:57 AM											

(2) CALCULATION.

(a) SAMPLE AT 0809 HOURS (14 MINUTES)–GRAVITY 45.9 API OR.7976 SPECIFIC GRAVITY.

(b) BBLS MIX AT 0809 HOURS (14 MINUTES)–33.8.

(c) AVERAGE GRAVITY OF VOLUME INCREMENTS AT 0808 HOURS (13 MINUTES) AND AT 0809 HOURS (14 MINUTES)–47.2 API OR .7918 SPECIFIC GRAVITY.

(d) .7918 (AVG SPEC GRAVITY OF BBLS MIX) –.7161(SPEC GRAVITY OF HEAD PRODUCT)
.8184 (SPEC GRAVITY OF DISPLACING PRODUCT) – .7161 (SPEC GRAVITY OF HEAD PRODUCT)
X 100 =73.99% DISPLACING PRODUCT (FUEL OIL) IN MIX.

(e) 73.99 (DISPLACING PRODUCT IN FUEL OIL MIX) X 33.6 (BBLS MIX) =26.0 6BLS DISPLACING PRODUCT (FUEL OIL) IN MIX

(f) 33.8 (BBLS MIX) – 25.0 BBLS DISPLACING PRODUCT(FUEL OIL) =8.8 BBLS HEAD PRODUCT (GASOLINE) IN MIX.

SIMILAR DATA SHOULD BE CALCULATED FOR EACH INCREMENT OF CHANGE. THE CUMULATIVE TOTALS OF EACH PRODUCT ARE THEN ADDED AND INSERTED AT BOTTOM OF APPLICABLE COLNUMS ON THE WORK SHEET.

Table VI
MINIMUM SAMPLING AND TESTING REQUIREMENTS FOR PETROLEUM PRODUCTS

SERIAL	LOCATION OF STOCK	TYPE OF STORAGE	WHEN SAMPLED	TYPE OF SAMPLE (SEE NOTE 2)	TYPE OF TEST REQUIRED	REMARKS
1	AT PRODUCT ORIGIN: REFINERIES, BLENDING INSTALLATIONS, ETC., ON PROCUREMENT, AND AT OTHER TERMINALS ON ESTABLISHEMENT OF NEW BATCHES	BULK	BEFORE ACCEPTANCE OF NEW PRODUCT AND AFTER ESTABLISHMENT OF NEW BATCH	UPPER, MIDDLE, AND LOWER COMPOSITE, OR ALL LEVEL COMPOSITE	A	QA, POLICIES AND PROCEDURES FOR PROCUREMENT ARE DIRECTED IN DLAM 4155.1
2	SHORE TANKS AND PIPELINE MAIN DEPOT RECEIVING TANK	BULK	BEFORE ISSUE	UPPER, MIDDLE AND LOWER COMPOSITE, OR ALL LEVEL COMPOSITE.	APPEARANCE GRAVITY, API COLOR FLASH POINT FILTRATION TIME FSII WATER REACTION (AS APPLICABLE)	STOCKS IN TANKS WHICH HAVE BEEN TESTED PREVIOUSLY WITHIN 90 DAYS NEED ONLY TYPE C. REFEREE SAMPLE WILL BE RETAINED.
3	TANKERS/BARGES LOADING LINES	BULK	DURING LOADING	CONTINUOUS LINE COMPOSITE IAW ASTM 4057	B–1	RETAIN AS REFEREE ONLY
3a	TANKERS AND BARGES	BULK	AFTER LOADING	ALL LEVELS FROM EACH COMPARTMENT	C	FOR GOVERNMENT–OWNED PRODUCT ONLY
				VOLUMETRIC COMPOSITE OF EACH CARGO ON BOARD	B–1	VESSEL MAY SAIL AFTER TYPE 'C' TESTS ARE OK. REMAINDER WILL BE COMPLETED PRIOR ARRIVAL AT DESTINATION.
3b	YARD OILERS	BULK	AFTER LOADING	VESSEL CARGO COMPOSITE	API, FLASH, S&W	NORMALLY YARD OILERS ARE IN DEDICATED SERVICE AND CARRY SHIPS FUELS
4	TANKERS AND BARGES	BULK	BEFORE DISCHARGE	ALL LEVEL SAMPLE OF EACH CARGO TANK.	C	IF PRODUCT PASSES, DISCHARGE IS AUTHORIZED.
			BEFORE DISCHARGE IF TESTING IS AVAILABLE AND RESULTS CAN BE OBTAINED BEFORE DISCHARGE IS COMPLETE.	VOLUMETRIC COMPOSITE SAMPLE OF EACH CARGO TANK.	B–1	PERFORM TESTS PRIOR TO OR DURING DISCHARGE.
			BEFORE DISCHARGE, IF TESTING IS NOT AVAILABLE AND RESULTS CAN NOT BE OBTAINED BEFORE DISCH IS COMPLETE	VOLUMETRIC COMPOSITE SAMPLE OF EACH CARGO TANK. RETAIN FOR AUDIT TRAIL.	B–1	RETAIN FOR AUDIT. TO BE TESTED IF ALL LEVELS SAMPLES TAKEN FROM EACH RECEIVING TANK AFTER DISCHARGE HAVE FAILED REQUIRED B–1 TESTS.
			IF ALL LEVEL SAMPLE FROM RECEIVING TANK FAILS B–1 TESTS.	AUDIT RETAIN SAMPLES.	B–1	PERFORM TESTS TO DETERMINE POINT OF CONTAMINATION.

Table VI
MINIMUM SAMPLING AND TESTING REQUIREMENTS FOR PETROLEUM PRODUCTS—Continued

SERIAL	LOCATION OF STOCK	TYPE OF STORAGE	WHEN SAMPLED	TYPE OF SAMPLE (SEE NOTE 2)	TYPE OF TEST REQUIRED	REMARKS
4a	DOCK/DISCHARGE MANIFOLD HEADER	BULK	CONTINUOUSLY DURING DISCHARGE BEGIN ONE HALF HOUR AFTER START OF DISCHARGE, SAMPLE EVERY HALF HOUR. IAW ASTM–D–4057 SECTIONS 7.3 AND 8.1.	COMPOSITE IAW ASTM–D–4057 SECTIONS 7.3 AND 8.1	RETAIN COMPOSITE SAMPLES	RETAIN FOR AUDIT. SEE NOTE 5 NOTE: FOR BARGE RECEIPTS DIRECTLY INTO A.F. BASES, REFER TO AF TO 42–11.
	DOCK/DISCHARGE MANIFOLD HEADER	BULK	CONTINUOUSLY DURING DISCH SAMPLE AT ONE HOUR AFTER START OF DISCH, MIDPOINT, AND ONE HOUR BEFORE COMPLETION OF DISCHARGE.	SAMPLE IAW ASTM–D–4057	PARTICULATE IAW ASTM–D–2276	SEE NOTE 5 NOTE: FOR BARGE RECEIPTS DIRECTLY INTO AF BASES, REFER TO AF TO 42–11.
	DOCK/DISCHARGE MANIFOLD HEADER	BULK	DURING DISCH OF JP5, JP8, F76. ONE HALF HOUR AFTER START OF DISCHARGE, SAMPLE EVERY HOUR.	DOCK HEADER SAMPLE OF THE JP–5, JP–8, OR F76	FLASH POINT OR EXPLOSIVITY	
5	TRANSFERS FROM MAIN INSTALLATIONS (SEE SERIAL 1) TO OTHER INSTALLATIONS	SEE SERIAL 1	SEE SERIAL 1	SEE SERIAL 1	SEE SERIAL 1	SEE SERIAL 1
5a	RECEIPT OF FUEL THROUGH MULTI–PRODUCT SYSTEMS	BULK	AFTER RECEIPT	EACH STORAGE TANK (SEE SERIAL 1)	TYPE B–1	COMPLETE INSPECTION REPORT IS FURNISHED FROM ORIGIN OF SHIPMENT, OTHERWISE TYPE A TESTS WILL BE REQUIRED.
		BULK	AFTER RECEIPT	EACH STORAGE TANK (SEE SERIAL 1)	TYPE A	INSPECTION REPORT IS NOT FURNISHED FROM ORIGIN OF SHIPMENT.
5b	RECEIPT OF FUEL BY WATERBORNE TRANSPORT	BULK	AFTER RECEIPT	AS FOR SERIAL 1 (FROM EACH STORAGE TANK)	TYPE B–1	ALSO JFTOT AFTER JP4/8 RECEIPT BY TANKER
5c	RECEIPT OF FUEL THROUGH A DEDICATED SYSTEM	BULK	AFTER RECEIPT	AS FOR SERIAL 1 (FROM EACH) STORAGE TANK)	TYPE C	
					TYPE B–1	ON INITIAL FILLING OR CHANGE OF GRADE
6	TRANSFERS WITHIN INSTALLATION OR DEPOT					

Table VI
MINIMUM SAMPLING AND TESTING REQUIREMENTS FOR PETROLEUM PRODUCTS—Continued

SERIAL	LOCATION OF STOCK	TYPE OF STORAGE	WHEN SAMPLED	TYPE OF SAMPLE (SEE NOTE 2)	TYPE OF TEST REQUIRED	REMARKS
6a	BATCHES PREPARED FROM APPROVED BATCH CONSOLIDATED BY TRANSFER THROUGH A DEDICATED SYSTEM	INSTALLATIONS AND DEPOTS	AFTER RECEIPT	SEE SERIAL 1	TYPE C	RETAIN FOR TWO MONTHS FOR AUDIT
6b	BATCHES PREPARED FROM APPROVED BATCH CONSOLIDATED BY TRANSFER THROUGH NON–DEDICATED SYSTEMS	INSTALLATIONS AND DEPOTS	AFTER RECEIPT	SEE SERIAL 1	TYPE B–1 OR TYPE B–3	AT DISCRETION OF AND AS AGREED UPON BY INSPECTION AUTHORITY.
6c	TRANSFER OF APPROVED BATCHES THROUGH A DEDICATED SYSTEM TO A DEDICATED TANK FOR ROAD OR RAIL LOADING SERVICES	INSTALLATIONS AND DEPOTS	AFTER RECEIPT	SEE SERIAL 1	TYPE C	SEE 6a REMARKS
7	DORMANT STOCKS WHERE–EVER LOCATED	BULK	ACCORDING TO MINIMUM FREQUENCY FOR TESTING OF DORMANT STOCKS ESTABLISHED BY QAR.	SEE SERIAL 1	TYPE A OR TYPE B–2 AT THE DISCRETION OF THE OWNING OR CUSTODIAL AUTHORITY, HAVING REGARD TO TYPE OF PRODUCT, AGE OF STOCK, CONDITIONS OF STORAGE ETC.	ESTABLISH HOMOGENEITY. IF HOMOGENEOUS THESE SAMPLES SHALL BE MIXED FOR REQUIRED TESTS.
8	FILLING POINTS FOR ROAD AND RAIL TANK CAR CONTAINERS, OR OTHER EQUIPMENT	BULK	DAILY ON FIRST CONTAINER FILLED AND ON CHANGEOVER TO FRESH FEED TANK	LINE SAMPLE	TYPE C	
9	IN RAIL TANK CARS AND ROAD TANK CARS ROAD TANK VEHICLES AND REFUELERS USED IN OVER THE ROAD TRANSPORT	BULK	AFTER LOADING AND BEFORE DISCHARGE	ALL LEVEL SAMPLE FROM THE RAIL CAR OR VEHICLE FROM EACH COMPARTMENT	TYPE C	ENSURE SEALS ARE INTACT.
10	TRANSFERS BY PIPELINE	BULK	AFTER PASSING OF INTERFACE AND ONE HOUR BEFORE ESTIMATED STOPPING.	LINE SAMPLE	TYPE C	

Table VI
MINIMUM SAMPLING AND TESTING REQUIREMENTS FOR PETROLEUM PRODUCTS—Continued

SERIAL	LOCATION OF STOCK	TYPE OF STORAGE	WHEN SAMPLED	TYPE OF SAMPLE (SEE NOTE 2)	TYPE OF TEST REQUIRED	REMARKS
11	TANKS CONTAINING INTERFACE MIXTURES FROM PIPELINE FOR REINJECTION	BULK	BEFORE REINJECTION	SEE SERIAL 1	TYPE B–3	REINJECTION OF INTERFACE PRODUCTS IS TO BE UNDER THE TECHNICAL CONTROL OF THE PIPELINE AUTHORITY OR IAW WITH O.A.
12	PACKAGED FUEL STOCKS WHEREVER LOCATED	PACKAGED	(a) PERIODICALLY AS REQUIRED IAW ASTM–D–4057	REPRESENTATIVE SAMPLE	TYPE B–2 (SEE NOTE 4)	ACCORDING TO REQUIRED INSPECTION OR INSPECTED ANNUALLY
			(b) WHEN CONTAMINATION OR DETERIORATION OF PRODUCT OR CONTAINER IS SUSPECTED	REPRESENTATIVE SAMPLE	TYPE B–2 (SEE NOTE 4)	INSPECTED AT LEAST ANNUALLY
			(c) WHEN IDENTITY IS UNCERTAIN	REPRESENTATIVE SAMPLE	TYPE B–2 (SEE NOTE 4)	
13	REFUELER TRUCKS SKID MOUNTED REFUELERS OR OTHER DISPENSING EQUIPMENT	BULK	AFTER RECIRCULATION OF FUEL	LINE SAMPLE	VISUAL CHECK FOR APPEARANCE, WATER, SEDIMENT	
						b. LABORATORY ANALYSIS FOR WATER AND SEDIMENT

Table VI–A
Types of tests required on gasoline, aviation

PROPERTIES	TYPE B-1 TEST	TYPE B-2 TEST	TYPE B-3 TEST	TYPE C TEST
WATER AND SOLIDS (VISUAL)?entry	X	X	X	X
SOLIDS (MILLIPORE)	X	X	X	–
COLOR (VISUAL)	X	X	X	X
SPECIFIC OR API GRAVITY	X	X	X	X
DISTILLATION	X	X	X	–
COPPER STRIP CORROSION	X	X	X	–
EXISTENT GUM	X	X	–	–
REID VAPOR PRESSURE	X	X	–	–
WATER REACTION	X	X	X	–
LEAN MIXTURE RATING	X	X	X	–
RICH MIXTURE RATING	X	X	–	–
LEAD CONTENT	X	X	–	–
POTENTIAL GUM	–	X	–	–

Table VI – B
Types of tests required on aircraft turbine fuels

TEST REQUIREMENTS	TYPE B–1 TEST	TYPE B–2 TEST	TYPE B–3 TEST	TYPE C TEST
WATER AND SOLIDS (VISUAL)?entry	X	X	X	X
COLOR (VISUAL)	X	X	X	X
SPECIFIC OR API GRAVITY	X	X	X	X
SOLIDS (MILLIPORE)	X	X	X	–
DISTILLATION	X	X	X	–
COPPER STRIP CORROSION	X	X	X	–
FREEZING POINT	X	X	X	–
EXISTENT GUM	X	X	X	–
REID VAPOR PRESSURE (JP–4 ONLY)	X	X	X	–
FLASH POINT (EXCEPT JP–4)	X	X	X	X
WATER REACTION	X	X	X	–
LEAD CONTENT (IF CONTAMINATION WITH LEADED FUELS IS SUSPECTED)	X	X	X	–
FUEL SYSTEM ICING INHIBITOR	X	X	X	–
FILTRATION TIME (JP–4 & 8)	X	X	X	–
WATER SEPARATION INDEX (JP–4 & 8)?entry	X	X	X	–
CONDUCTIVITY (JP–4 AND JP–8)?entry	X	X	X	–
THERMAL STABILITY	–	X	–	–
COLOR (SAYBOLT)	–	X	–	–
ACID NUMBER	–	X	–	–
PEROXIDE NUMBER(JP–5)	–	X	–	–

Table VI – C
Types of tests required on gasoline, automotive

TEST REQUIREMENTS	TYPE B–1 TEST	TYPE B–2 TEST	TYPE B–3 TEST	TYPE C TEST
APPEARANCE	X	X	X	X
WATER AND SOLIDS (VISUAL)	X	X	X	X
COLOR (VISUAL)	X	X	X	X
SPECIFIC OR API GRAVITY	X	X	X	X
DISTILLATION	X	X	X	–
REID VAPOR PRESSURE	X	X	–	–
COPPER STRIP CORROSION	–	X	X	–
UNWASHED GUM	–	X	X	–

TEST REQUIREMENTS	TYPE B–1 TEST	TYPE B–2 TEST	TYPE B–3 TEST	TYPE C TEST
KNOCK RATING (RON AND MON)	X	X	–	–
OXIDATION STABILITY	–	X	–	–
LEAD CONTENT	–	–	X	–
WATER TOLERANCE?entry	X	X	X	–

Table VI– D
Types of tests required on diesel fuel and kerosene?title

TEST REQUIREMENTS	TYPE B–1 TEST	TYPE B–2 TEST	TYPE B–3 TEST	TYPE C TEST
APPEARANCE	X	X	X	X
COLOR	X	X	X	(VISUAL)X
SPECIFIC OR API GRAVITY	X	X	X	X
DISTILLATION	X	X	–	–
FLASH POINT	X	X	X	X
CARBON RESIDUE (DIESEL FUEL ONLY)	X	X	–	–
CLOUD POINT	–	X	–	–
POUR POINT	–	X	–	–
CORROSION	–	X	–	–
CETANE INDEX	–	X	–	–
VISCOSITY	–	X	–	–
WATER & SEDIMENT BY CENTRIFUGE	–	X	–	–
PARTICULATE (V V–F–800 & F–76)	X	X	–	–
ACCELERATED STABILITY	–	X	–	–
SULFUR	–	X	–	–

Table VI – E
Types of tests required on burner fuels?title

TEST REQUIREMENTS	TYPE B–1 TEST	TYPE B–2 TEST	TYPE B–3 TEST	TYPE C TEST
FLASH POINT	X	X	X	X
BS AND W (CENTRIFUGE)	X	X	X	X
VISCOSITY	X	X	–	–
ASH	–	X	–	–
CARBON RESIDUE	X	–	–	–
SEDIMENT BY EXTRACTION	–	X	–	–
POUR POINT	–	X	–	–

Table VI – F
Types of tests required for lubricating oils?title

TEST REQUIREMENTS	TYPE B–1 TEST	TYPE B–2 TEST	TYPE C TEST
APPEARANCE	X	X	X
COLOR	X	X	X
GRAVITY	X	X	X
VISCOSITY	X	X	X
FLASH POINT	X	X	X
POUR POINT	–	X	–
NEUTRALIZATION NUMBER	–	X	–
ASH	–	X	–
CORROSION	–	X	–
METAL COMPONENTS (WHEN LISTED IN PURCHASE SPECIFICATION)	–	X	–
FOAM TEST	–	X	–
SEPARATION	–	X	–
WATER (BY CENTRIFUGE)	X	X	X
SAPONIFICATION NUMBER	–	X	–
CARBON RESIDUE	–	X	–
SOLID CONTAMINANTS	X	X	–
PRECIPITATION NUMBER	–	X	–
LEAD CORROSION	–	X	–
CORROSION & OXIDATION STABILITY	–	X	–
PROTECTION	–	X	–

Glossary

Section I
Abbreviations

API
American Petroleum Institute

ASTM
American Society for Testing and Materials

AVGAS
Aviation Gasoline

BPH
Barrels Per Hour

BS&W
Basic Sediment and Water

CAO
Contract Administration Office

CAS
Contract Administration Service

COCO
Contractor–Owned, Contractor–Operated

COMSC
Commanding Officer Military Sealift Command

CONUS
Continental United States

CQA
Contract Quality Assurance

DCASR
Defense Contract Administration Service Region

DFSC
Defense Fuel Supply Center

DFSP
Defense Fuel Supply Point

DGSC
Defense General Supply Center

DFAMS
Defense Fuels Automated Management System

DLA
Defense Logistics Agency

DLAH
Defense Logistics Agency Handbook

DLAM
Defense Logistics Agency Manual

DLAR
Defense Logistics Agency Regulation

DoD
Department of Defense

DoE
Department of Energy

ETA
Estimated Time of Arrival

FAR
Federal Acquisition Regulation

FOB
Free On–Board

GOCO
Government–Owned, Contractor–Operated

HS
Hydrogen Sulfide

HQ
Headquarters

IGS
Inert Gas Systems

MIL–HDBK
Military Handbook

MOGAS
Motor Gasoline

MOU
Memorandum of Understanding

MMC
Marine Moisture Control Company

MSC
Military Sealift Command

MV
Motor Vessel

PAS
Preaward Survey

PO
Purchasing Officer

PQA
Petroleum Quality Assurance

QA
Quality Assurance

QAR
Quality Assurance Representative

QPL
Qualified Product List

QSR
Quality Surveillance Representative

ROB
Remaining On–Board

TANKOPINS
Tanker Operating Instructions

?subpara3 1 Applicable only to sales on drawdown.

?subpara3 1 This is mandatory for FOB origin cargos, but may also be performed on FOB destination cargos.

?entry 1 Obtain sample in a clear round one quart glass bottle, swirl the bottle vigorously so a vortex is formed. Visually check for sediment at the point of the vortex. If sediment is visible, a spot larger than 3mm diameter indicates corrective action should be taken to prevent the delivery of contaminated fuel.

?entry 1Clean and bright and free of undissolved water. Obtain sample in a clear, round one quart glass bottle, swirl the bottle vigorously so a vortex is formed. Visually check for sediment at the point of the vortex. If sediment is visible, a spot larger than 3mm diameter indicates corrective action should be taken to prevent the delivery of contaminated fuel.

?entry 2Water separation index, modified testing is not performed if the fuel contains conductivity additive.

?entry 3If fuel contains conductivity additive, CU readings should be taken within two minutes of sampling.

?entry 1Gasohol only.

?title 1When specified.

?title 1 When specified.

?title 1 When cited in the specification.

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